State: WV Year: 06

			Hardcopy	Electronic File
State Lab SDWA Inspection				
	Introduction Letter		yes	yes
	Presurvey Package		yes	yes
	Reports:	Inorganic	yes	yes
		Organic (no organic)	~~no~~	~~no~~
		Mircobiology	yes	yes
		RadioChemistry	~~no~~	~~no~~
	on file metal			
	Corrective Action Report	Only Areas with Findings	yes	yes
	Update Report/s	Only Areas with Findings	yes	yes
	Additional Correspondence	As Necessary	yes	yes
	Close Out Letter		yes	yes
	Prof. Testing		yes	no
	Lab Quality Manual		yes	yes
State Lab Cert. Program Review				
	Introduction Letter	yes	yes	yes
	Report	yes	yes	yes
	Corrective Action Report		yes	yes
	Additional Correspondence			
	additional documents	RAD certs	yes	no
Additional Records				
	Yearly Program Questionnaires		yes	yes
	Yearly Lab Cert Summary		yes	yes

J: \ ASQAB \ Inspections \ State Lab Inspect Rpts & Rev \ WV 2006

empty

Name	Size	Type	Last Modified
CA Plan	0	File Folder	9/28/2006 8:05 PM
Close Out Letter	0	File Folder	9/28/2006 8:05 PM
Compl Presurvey	0	File Folder	9/28/2006 8:04 PM
Corr Act	0	File Folder	11/15/2006 10:58 AM
correspdence	0	File Folder	9/28/2006 8:04 PM
Coverletter	0	File Folder	9/28/2006 8:04 PM
Final lab Inspect Reports	0	File Folder	9/28/2006 8:04 PM
Inorg Non Metals	0	File Folder	9/28/2006 8:04 PM
Lab Cert Program	0	File Folder	9/28/2006 8:04 PM
Metals SOP's	0	File Folder	9/28/2006 8:04 PM
micro SOPs & Cklist as spreadsht	0	File Folder	9/28/2006 8:04 PM
Presurvey problems	0	File Folder	9/28/2006 8:04 PM
QA Manual	0	File Folder	9/28/2006 8:04 PM
Update Repts	0	File Folder	9/28/2006 8:04 PM

J: \ ASQAB \ Inspections \ State Lab Inspect Rpts & Rev \ WV 2006 \ Close Out Letter

Name	Size	Type	Last Modified
Status update and close out of WV June 2003 on-site.doc	26KB		Microsoft Word Document 12/19/2006 5:42 PM

J: \ ASQAB \ Inspections \ State Lab Inspect Rpts & Rev \ WV 2006 \ Compl Presurvey

Name	Size	Type	Last Modified
2005 WV Lab Certificate.doc	304KB	Microsoft Word Document	9/11/2006 9:23 AM
cert of labs doing orgs for WV Dept	8,216	File	7/27/2006 12:30 PM
Chem Presurvey.rtf	1,262KB	Rich Text Format	9/14/2006 4:39 PM
GL's notes on presurvey.doc	25KB	Microsoft Word Document	9/6/2006 2:59 PM
InventoryWV06 Presurv Matr'ls Incldg SOP.doc	25KB	Microsoft Word Document	8/16/2006 10:59 AM
Micro Presurvey.doc	139KB	Microsoft Word Document	9/14/2006 4:38 PM

J: \ ASQAB \ Inspections \ State Lab Inspect Rpts & Rev \ WV 2006 \ Corr Act

Name	Size	Type	Last Modified
Chemistry Audit Response 2006.doc	115KB	Microsoft Word Document	11/20/2006 3:12 PM
LD cover letter	1;460	File	11/20/2006 3:14 PM
Micro Reporting	2,506	File	11/27/2006 12:45 PM
RobinC on Hg MDL	5,265	File	11/15/2006 10:58 AM
WV CAplan 2006.pdf	731KB	Adobe Acrobat 7.0 Document	11/22/2006 2:35 PM

J: \ ASQAB \ Inspections \ State Lab Inspect Rpts & Rev \ WV 2006 \ correspdence

Name	Size	Type	Last Modified
Finding or Recom Data Repting.doc	25KB	Microsoft Word Document	10/13/2006 12:36 PM
questions	4,427	File	9/27/2006 10:15 AM
wjohnsonltr	3,249	File	9/27/2006 1:39 PM
WV06action items	4,427	File	9/27/2006 1:29 PM

J: \ ASQAB \ Inspections \ State Lab Inspect Rpts & Rev \ WV 2006 \ Coverletter

Name	Size	Type	Last Modified
Coverletter PS-6-21-06.doc	30KB	Microsoft Word Document	6/21/2006 10:47 AM
Coverletter PS-6-26-06.doc	30KB	Microsoft Word Document	6/26/2006 11:52 AM
Coverletter Reports_10_24_06.doc	27KB	Microsoft Word Document	10/24/2006 4:41 PM

J: \ ASQAB \ Inspections \ State Lab Inspect Rpts & Rev \ WV 2006 \ Final lab Inspect Reports

Name	Size	Type	Last Modified
older versions	0	File Folder	10/24/2006 10:52 AM
Inorg_10_24_06_JS.doc	139KB	Microsoft Word Document	11/14/2006 4:56 PM
Turbidity.doc	23KB	Microsoft Word Document	12/19/2006 5:40 PM
WVmicro06.doc	95KB	Microsoft Word Document	10/24/2006 1:57 PM

J: \ ASQAB \ Inspections \ State Lab Inspect Rpts & Rev \ WV 2006 \ Inorg Non Metals

Name	Size	Type	Last Modified
Alkalinity Method.doc	366KB	Microsoft Word Document	8/7/2006 2:54 PM
Calcium Hardness Method.doc	353KB	Microsoft Word Document	8/7/2006 2:54 PM
Combined Nitrate Nitraite Method.doc	373KB	Microsoft Word Document	8/7/2006 2:55 PM
Conductivity method.doc	320KB	Microsoft Word Document	8/7/2006 2:55 PM
Fluoride Chloride Sulfate Method.doc	380KB	Microsoft Word Document	8/7/2006 2:55 PM
Free Cyanide Method.doc	334KB	Microsoft Word Document	8/7/2006 2:55 PM
Index.doc	41KB	Microsoft Word Document	8/7/2006 2:55 PM
IOU followup_9_26_06	4,424	File	9/26/2006 12:55 PM
Nitrate and Nitrite by IC Method.doc	373KB	Microsoft Word Document	8/7/2006 2:55 PM
pH Method.doc	235KB	Microsoft Word Document	8/7/2006 2:55 PM
Total Dissolved Solids Method.doc	487KB	Microsoft Word Document	8/7/2006 2:55 PM
Total Hardness Method.doc	318KB	Microsoft Word Document	8/7/2006 2:55 PM
TRACKING FORM FOR REVISIONS.doc	68KB	Microsoft Word Document	8/7/2006 2:55 PM
Turbidity Method.doc	303KB	Microsoft Word Document	8/7/2006 2:55 PM
WV06nonmetals table9-7-06.doc	160KB	Microsoft Word Document	9/7/2006 6:20 PM
WV06nonmetals table9-10-06.doc	161KB	Microsoft Word Document	9/10/2006 10:32 AM
WV06nonmetals table9-11-06.doc	178KB	Microsoft Word Document	9/11/2006 8:27 AM
WV06nonmetals table9-12-06.doc	165KB	Microsoft Word Document	9/12/2006 3:45 PM
WV06nonmetals table9-15-06.doc	169KB	Microsoft Word Document	9/15/2006 5:33 PM
WV To DO & IOU & U Owe Me.doc	26KB	Microsoft Word Document	9/26/2006 10:07 AM

J: \ ASQAB \ Inspections \ State Lab Inspect Rpts & Rev \ WV 2006 \ lab Cert Program

Name	Size	Type	Last Modified
Chapter XX - Drinking Water Certi fication Rev. 8-23-01.wpd	65KB	WordPerfect 9 Document	8/31/2006 3:02 PM
Chem Labor Cert SOP.doc	20MB	Microsoft Word Document	12/1/2005 3:49 PM
Chem Lab Cert SOP R2.3.doc	33MB	Microsoft Word Document	8/7/2006 3:01 PM
Chemi Drinking water lab Cert SOP R2.3.doc	33MB	Microsoft Word Document	8/7/2006 3:01 PM
micro lab list cover	3,080	File	9/1/2006 11:17 AM
New Presurvey Form.doc	1,172KB	Microsoft Word Document	9/25/2006 9:22 AM
Operators do pH temp and Res Cl2	2,613	File	1/4/2007 9:13 AM
Plan for oversight Inspect	2,576	File	7/19/2006 4:03 PM
PTWS Enrollment FORM.doc	128KB	Microsoft Word Document	9/25/2006 9:22 AM
Question about onsite	522	File	9/27/2006 3:16 PM
Questions to WandaJ_9_26_06	2,895	File	9/26/2006 12:25 PM
Report from obser on site9-21-06 Complete.pdf	131KB	Adobe Acrobat 7.0 Document	11/28/2006 8:49 AM
Scope of State Certs to JG	4,577	File	9/27/2006 3:47 PM
waterqualitylabs.pdf	183KB	Adobe Acrobat 7.0 Document	9/1/2006 9:07 AM
webpage.doc	23KB	Microsoft Word Document	9/10/2006 11:57 AM
WV Cert Program_9_24_06last.doc	55KB	Microsoft Word Document	10/24/2006 2:07 PM
WV Cert Program_10_24_06.doc	56KB	Microsoft Word Document	11/14/2006 5:25 PM
WVAW-Kan 9-06 Final.pdf	34KB	Adobe Acrobat 7.0 Document	12/4/2006 11:11 AM

J: \ ASQAB \ Inspections \ State Lab Inspect Rpts & Rev \ WV 2006 \ Metals SOP's

Name	Size	Type	Last Modified
Revision Tracking Forms	0	File Folder	9/28/2006 8:04 PM
AA Furnace.doc	88KB	Microsoft Word Document	8/7/2006 2:54 PM
Cu-SM3111BSOP2005.doc	167KB	Microsoft Word Document	8/7/2006 2:54 PM
EPA245.1 SOP2006.doc	112KB	Microsoft Word Document	8/7/2006 2:54 PM
EPA 200.9 for Thallium 2003.doc	223KB	Microsoft Word Document	8/7/2006 2:54 PM
Index for SOP.doc	43KB	Microsoft Word Document	8/7/2006 2:54 PM
Mercury Method.doc	318KB	Microsoft Word Document	8/7/2006 2:54 PM
SM3111B SOP2005.doc	277KB	Microsoft Word Document	8/7/2006 2:54 PM
SM3113B SOP2005.doc	165KB	Microsoft Word Document	8/7/2006 2:54 PM
VarianICP-SOP2005.doc	129KB	Microsoft Word Document	8/7/2006 2:54 PM

J: \ ASQAB \ Inspections \ State Lab Inspect Rpts & Rev \ WV 2006 \ micro SOPs & Cklist as spreadsht

Name	Size	Type	Last Modified	
Chapter XX - Drinking Water Certi fication Rev. 8-23-01.wpd	65KB	WordPerfect 9 Document	8/31/2006 3:02 PM	
ChromoFluoro100 10-16-00.wpd	19KB	WordPerfect 9 Document	8/31/2006 3:02 PM	
Cover to Micro cklist	1,460	File	8/17/2006 12:15 PM	
In House Water Audit 7-2006.xls	123KB	Microsoft Excel Worksheet	8/17/2006 10:56 AM	
Membrane Filter 100 mL.wpd	41KB	WordPerfect 9 Document	8/31/2006 3:02 PM	
MTF100 CH 6-16-00.wpd	25KB	WordPerfect 9 Document	8/31/2006 3:02 PM	
report=WS120.pdf	21KB	Adobe Acrobat 7.0 Document	9/15/2006 8:57 AM	
WS-89.pdf	311KB	Adobe Acrobat 7.0 Document	9/15/2006 8:57 AM	
WS-90.pdf	312KB	Adobe Acrobat 7.0 Document	9/15/2006 8:57 AM	
WS-91.pdf	155KB	Adobe Acrobat 7.0 Document	9/15/2006 8:57 AM	
WS-101.pdf	115KB	Adobe Acrobat 7.0 Document	9/15/2006 8:57 AM	
WS-102.pdf	113KB	Adobe Acrobat 7.0 Document	9/15/2006 8:57 AM	
WS-113.pdf	185KB	Adobe Acrobat 7.0 Document	9/15/2006 8:57 AM	
WS-114.pdf	186KB	Adobe Acrobat 7.0 Document	9/15/2006 8:57 AM	
WS-115.pdf	404KB	Adobe Acrobat 7.0 Document	9/15/2006 8:57 AM	

J: \ ASQAB \ Inspections \ State Lab Inspect Rpts & Rev \ WV 2006 \ Presurvey problems

Name	Size	Type	Last Modified
Missing stuff	6,117	File	8/30/2006 7:22 PM
response presur issues.doc	31KB	Microsoft Word Document	9/7/2006 5:54 PM
WV reply to missing stuff	1,572	File	8/31/2006 12:28 PM

J: \ ASQAB \ Inspections \ State Lab Inspect Rpts & Rev \ WV 2006 \ QA Manual

Name	Size	Type	Last Modified
2006 QA Man.4th Rev.doc	2,608KB	Microsoft Word Document	8/7/2006 2:56 PM
2006 QM 4th Rev.doc	2,608KB	Microsoft Word Document	8/7/2006 2:56 PM
Compare 2006 vs 2005.doc	3,445KB	Microsoft Word Document	9/8/2006 11:34 AM
QA MANUAL - ENVIRONMENTAL.doc	2,577KB	Microsoft Word Document	12/1/2005 3:46 PM
WV lab QM Review_9_6_06.doc	49KB	Microsoft Word Document	9/8/2006 11:54 AM

J: \ ASQAB \ Inspections \ State Lab Inspect Rpts & Rev \ WV 2006 \ Update Repts

Name	Size	Type	Last Modified
Inorganic_11_27_06.doc	61KB	Microsoft Word Document	11/27/2006 6:16 PM
Inorganic_12_18_06.doc	61KB	Microsoft Word Document	12/18/2006 7:17 PM
Inorganic_12_19_06.doc	62KB	Microsoft Word Document	12/19/2006 5:43 PM

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SCIENCE CENTER
Analytical Services and Quality Assurance Branch
701 Mapes Road
Fort Meade, MD 20755-5350

June 26, 2006

Dr. Andrea Labik, Director
Office of Laboratory Services
WV Department for Health
167 11th Avenue
South Charleston, WV 25303

Dear Dr. Labick:

I would like to schedule the next SDWA on-site assessment.

What: SDWA on-assessment of the West Virginia Department of Health (WV DH) laboratory that includes a data audit (checking analytical results from sample log-in and the instrument printouts to the final reported results). This will include microbiology and inorganic. The inspection will focus on SDWA analytical work and will not include CWA (NPDES). In addition, the WV DH's SDWA Laboratory Certification program will be reviewed.

When: Sept 19-22 (beginning at 9 AM on Tuesday 9/19, with the closing meeting for microbiology and inorganic on Wednesday afternoon , or earlier if possible). The review of WV DH's SDWA Laboratory Certification program will be conducted on Thursday 9/21 and close out Friday . The review will focus on program documentation, laboratory file records, interviews, and will include observation of a WV DH assessment.

Who (Inspection Team): Dave Russell (microbiology); Robin Costas, George Long, and Joe Slayton (inorganic chemistry). George Long and Joe Slayton will review of the laboratory's quality system and WV DH's Lab Certification Program.

Preparation: We are asking for more material up front in our presurvey this year, *e.g.* , demonstrations of capability and supporting data, SOP's, supporting data for proficiency testing with results. By so doing, the on-site will be facilitated and be less disruptive of the WV DH Lab. Pre-survey material (questionnaires to assist the assessment team) are attached. This information is provided electronically and we request that if possible it be completed and returned electronically. A hardcopy version of this letter and package are being mailed as a backup, which hopefully will not be needed. To maximize the usefulness to the team, we request that the pre-survey material be provided by August 14, 2006

Also in preparation for the WV Lab Cert. program review, please schedule an on-site SDWA assessment (chemistry) for Thursday 9/21/06 ideally in the Charleston area.

If you have any questions please call me at 410-305-2653 or E-mail (Slayton.joe@epa.gov).

Sincerely,

Joseph Slayton
Technical Director

Attachment A. Microbiology Presurvey Questionnaire
Attachment B. Inorganic Chemistry Presurvey Questionnaire

cc: Wanda Johnson (3WP22)
Richard Rogers (3WP22)
Charles Jones, Jr . (3EA00)
Robin Costas (3EA20)
George Long (3EA20)
Dave Russell (3EA20)

Joe Slayton/ESC/R3/USEPA/US

06/26/2006 11:53 AM

To AndrealLabik@wvdhhr.org

cc TomOng@wcdhhr.org, LarryDuffield@wvdhhr.org, Rick Rogers/R3/USEPA/US, Charlie Jones/R3/USEPA/US, WandaF Johnson/R3/USEPA/US, Robin

bcc

Subject WV Health Laboratory SDWA On-site and WV SDWA Lab Certification Program Review

Signed hardcopies are being mailed today.

Coverletter PS-6-26-06.doc

Attach 3 Presurvey 6-20-06.rtf

Micro Presurvey_6-20-06.rtf

If you have any questions or problems completing the forms or collected the material requested prior to the on-site, please let me or George Long know. Thanks, Joe Slayton

Ex. 5 - Deliberative

Larry Duffield
<larryduffield@wvdhhr.org>
08/31/2006 10:50 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc George Long/ESC/R3/USEPA/US@EPA
bcc
Subject Re: Fw: PreSurvey

Joe,

We are assessing the Pre-Survey questions about the missing IDCs and MDLs you sent me this morning. I've asked Greg to craft a response to each item and we should be able to e-mail that to you tomorrow. Greg has been very busy training Martha and reorganizing the WetChem lab where all of these parameter's issues reside so he is the one who can best answer them. For some issues I think we might have questions for you and we may require some guidance. Any data that we find that we haven't sent, we will send PDQ.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

Inventory of WV 2006 Presurvey Materials Including SOP's and Quality Assurance Manual
(Stored in A215)

Folder #1
- A. Microbiology Presurvey Form (incomplete)
- B. Environmental Chemistry Presurvey Form (complete)
- C. Organization Charts
- D. Internal Audit Environmental Chem 2006

Folder #2
- A. Patrick Marchio & Greg Young Metals Lab: IDC's, Summaries , and Supporting Data

Folder #3
- A. Wet Chem IDC Summaries and Supporting Data

Folder #4.
- A. Metals MDLs

Notes: a.The analyst is measuring not from the baseline (in 300.0) , but from the bottom of the chart
- b. for Fluoride is there an actual chromatogram?
- c. Question on sig. figs in std deviations etc.
- d. See lab cert manual IV-6-IV-9

Folder 5.
- A. Wet Chem MDL Studies and Supporting Data

Folder 6.
- A. Scored PT's

Folder #7
- A. Wet Chem PT's WS-115 and WS-118

Folder # 8
- A. Metals Lab Raw Data : PTs WS 115 and Make-up PT WS-118

Folder # 9
- A. Certificates/ Parameter List
- B. Chain of Custody Forms (Chemistry)

Folder #10
- A. Phone Directories
- B. Floor Plans for Environmental Chemistry
- C. Signature pages for Quality Manual
- D. Signature pages for Lab Certification SOPs
- E Signature pages for Method SOPs

Note : Folders 6 and 7 were later combined

Folder 11

WV 2006 Primacy Matrls

D: \

Name	Size	Type	Last Modified
Metals SOP's	0	File Folder	8/7/2006 3:04 PM
Wet Chemistry SOP's	0	File Folder	8/7/2006 3:04 PM
2006 Quality Assurance Manual Fourth Revision	2,608KB	Microsoft Word Document	8/7/2006 2:56 PM
Chemistry Drinking Water Laboratory Certification SOP R2.3	33MB	Microsoft Word Document	8/7/2006 3:02 PM

D: \ Metals SOP's

Name	Size	Type	Last Modified
Revision Tracking Forms	0	File Folder	8/7/2006 3:04 PM
AA Furnace	88KB	Microsoft Word Document	8/7/2006 2:54 PM
Cu-SM3111BSOP2005	167KB	Microsoft Word Document	8/7/2006 2:54 PM
EPA 200.9 for Thallium 2003	223KB	Microsoft Word Document	8/7/2006 2:54 PM
EPA245.1 SOP2006	112KB	Microsoft Word Document	8/7/2006 2:54 PM
Index for SOP	43KB	Microsoft Word Document	8/7/2006 2:54 PM
Mercury Method	318KB	Microsoft Word Document	8/7/2006 2:54 PM
SM3111B SOP2005	277KB	Microsoft Word Document	8/7/2006 2:54 PM
SM3113B SOP2005	165KB	Microsoft Word Document	8/7/2006 2:54 PM
VarianICP-SOP2005	129KB	Microsoft Word Document	8/7/2006 2:54 PM

D: \ Metals SOP's \ Revision Tracking Forms

Name	Size	Type	Last Modified
Blank TRACKING FORM FOR REVISIONS	85KB	Microsoft Word Document	8/7/2006 2:54 PM
TRACKING FORM FOR REVISIONS #1	60KB	Microsoft Word Document	8/7/2006 2:54 PM
TRACKING FORM FOR REVISIONS #2	81KB	Microsoft Word Document	8/7/2006 2:54 PM

D: \ Wet Chemistry SOP's

Name	Size	Type	Last Modified
Alkalinity Method	366KB	Microsoft Word Document	8/7/2006 2:54 PM
Calcium Hardness Method	353KB	Microsoft Word Document	8/7/2006 2:55 PM
Combined Nitrate Nitraite Method	373KB	Microsoft Word Document	8/7/2006 2:55 PM
Conductivity method	320KB	Microsoft Word Document	8/7/2006 2:55 PM
Fluoride Chloride Sulfate Method	380KB	Microsoft Word Document	8/7/2006 2:55 PM
Free Cyanide Method	334KB	Microsoft Word Document	8/7/2006 2:55 PM
Index	41KB	Microsoft Word Document	8/7/2006 2:55 PM
Nitrate and Nitrite by IC Method	373KB	Microsoft Word Document	8/7/2006 2:55 PM
pH Method	235KB	Microsoft Word Document	8/7/2006 2:55 PM
Total Dissolved Solids Method	487KB	Microsoft Word Document	8/7/2006 2:55 PM
Total Hardness Method	318KB	Microsoft Word Document	8/7/2006 2:55 PM
TRACKING FORM FOR REVISIONS	68KB	Microsoft Word Document	8/7/2006 2:55 PM
Turbidity Method	303KB	Microsoft Word Document	8/7/2006 2:55 PM

11.3 Attachment #3: Example On-site Pre-survey Package Template (General Information and Chemistry) rev. 6/20/06

State Laboratory SDWA Pre-Survey Package (Based on 5th ed. of "Lab Cert. Manual")

(Please complete electronically)

Date: Completed by (name/title): **Larry A. Duffield, Program Manager I**

Only complete for Methods/Analytes for which the Laboratory seeks SDWA Certification

I. General Information:

A. Name of Laboratory: **Environmental Chemistry Section, Office of Laboratory Services**

B. Address: **4710 Chimney Dr., Suite G, Charleston, WV 25302**

C. Telephone Number: **(304) 965-2694**

D. Name of Laboratory Director: **Dr. Andrea Labik, ScD.**

E. Provide an organizational chart of the laboratory, including any field operations or other internal affiliations to show how the laboratory fits into the general organizational structure.
Indicate SDWA and NPDES related portions of the laboratory organization.

Organization Charts U.S. Mailed

F. List names of principal users of services of the laboratory.
Public Water Systems
Office of Environmental Health Services (OEHS) Engineers
State Sanitarians
County Sanitarians
Private Citizens/Well Owners

G. List laboratory support provided by commercial laboratories, and other State or Federal laboratories
NONE

H. Indicate the approximate number of samples analyzed:

	Microbiology		Chemical			
	Approximate Number of Samples/Year	Approximate % of Laboratory Workload/Yr.	Approximate No. Samples/Year Organic/Inorganic		Approximate % of Lab.Workload/Yr. Organic/Inorganic	
SDWA				**Samples 187** **Tests 212**		**Samples 41%** **Tests 23%**
NPDES						
RCRA						
Superfund						
Other Monitoring				**Samples 269** **Tests 708**		**Samples 59%** **Tests 77%**

Please provide a listing of any codes used for Sample log-in which indicate the associated program:
There is no specific code to differentiate between SDWA regulatory compliance samples and all "other" types. However, compliance samples can be picked out due to the check columns marked as to where copies of the reports are sent. Copies of compliance samples are sent to four separate offices, more than "other" types of samples.

I. Personnel: Provide an organizational Chart which indicates how the Environmental Analyses Sections fit within the organization and how the lab fits in the larger Department/Bureau, etc.
Organization Charts U.S. Mailed for:
Environmental Chemistry
Office of Laboratory Services
Bureau for Public Health

Also , please complete this chart for all technical personnel, including the laboratory director. Use a separate block for each employee and arrange the presentation to reflect the lines of organizational responsibility for Chemistry and Microbiology.

Personnel (Cont.):

Name	Training		Position	Years of Experience		Identify Current An Performed in Suppor	
	Degree (Check One)	Major		Present Job	Previous Job	SDWA	NPD
Andrea M. Labik, Sc.D	X Sc.D. MS BS/BA Assoc. HS	Public Health Microbiology	Director, OLS	6 Yr.,10Mo.	3 Yr., 9 Yr.		
Charlotte J. Billingsley	Ph.D. X MS BS/BA Assoc. HS	Bacteriology	Associate Director	13 Yr.	23 Yr.		

Larry A. Duffield	Ph.D. MS X BS Assoc. HS	Biology	Program Manager I	2 Yr.	20 Yr.		
Greg W. Young	Ph.D. MS X BS Assoc. HS	Chemistry	Chemist II	7 Yr.	3 Yr.	Fluoride, Chloride, Sulfate by 300.0; Nitrate/Nitrite by 353.2; CN by 4500CN-F; TDS; pH; Turbidity; Conductivity; Thallium by 200.9	

Personnel (Cont.):

Name	Training		Position	Years of Experience		Identify Current An Performed in Suppor	
						SDWA	NPD
	Degree (Check One)	Major		Present Job	Previous Job		
Patrick L Marchio	Ph.D. MS X BS Assoc. HS	Biology	Chemist I	1.5 Yr.	4 Yr. Private lab	Regulated Metals by SM3113B, EPA 200.7, SM3111B, EPA 245.1	

Martha McElfresh	Ph.D. MS X BS Assoc. HS	Chemistry	Chemist I	Started June 16,2006	18 Yr. Private Lab	In-training for parameters Greg Young is doing	
Becky Payne	Ph.D. MS BS/BA Assoc. X HS		Laboratory Assistant III	12 Yr.	4 Yr.	Alkalinity ; Total and Calcium Hardness; Calcium and Magnesium by titration	
Rebecca Hill	Ph.D. MS BS/BA Assoc. X HS		Office Assistant II	5 Yr.		Sample Receiving, Log-in, Tracking, Reporting	

Personnel (Cont.):

Name	Training		Position	Years of Experience		Identify Current An Performed in Suppor
	Degree (Check One)	Major		Present Job	Previous Job	SDWA NPD

	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						

Personnel (Cont.):

Name	Training		Position	Years of Experience		Identify Current An Performed in Suppor	
						SDWA	NPD
	Degree (Check One)	Major		Present Job	Previous Job		
	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						

III. Quality Assurance Policies and QC Procedures: **Chemistry**

	SDWA
	Y/N
A. Is there a Quality Assurance Manual?	**Y**
B. Is there a Quality Control/ Assurance Officer?	**Y, Larry Duffield**
Where are the duties of the QCO/QAO described?	**Pages 5-6**

C. Frequency of:

SDWA
Y/N
Duplicate Analyses? **Y**
Lab Reagent Blanks **Y**
Spike Analyses? **Y**
Check Standards? **Y**
2nd Source QC Materials for Calibration Verification? **Y**
In-House Inspections/Assessment? **N**

D. Records and Control Limits Maintained:

SDWA	
Records	Limits
Y/N	Y/N
Duplicate Analyses?	**Y** **Y**
Spike Analyses?	**Y** **Y**
Check Standards?	**Y** **Y**

List analyses for which "No" applies (Items A - D above):

SDWA: **There is no stated frequency in the QA Manual for In- House Systems Audits or In-House Proficiency Tests. Also, frequency and limits of Quality Control testing is specified in method SOPs.**

E. What corrections are taken for failed QC checks?

Duplicate analyses (SDWA): **Corrected via SOP protocol**

Spike Analyses (SDWA): **Corrected via SOP protocol**

Calibration Check Standards: **Corrected via SOP protocol**

F. Are records maintained of problems and corrective

SDWA
Y/N
Out of control Spike results? **Y**
Out of control Check Standards? **Y**
Out of control duplicate results? **Y**
Out of control In-House Audits? **N**

G. Calibration Data:

	SDWA
	Y/N
Are instrument calibration data recorded?	Y
Does standard calibration include ≥ 3 standards and a reagent blank?	Y
Is one calibration standard at or below the MCL (**SDWA**), permit limit (NPDES)?	Y
Do standard concentrations bracket sample concentrations?	Y

List analyses for which "No" applies (Items F - G above):

SDWA: **No In-House Audit Samples analyzed**

H. Routine service checks:

	SDWA
	Y/N
Are routine service checks performed on analytical instruments (balances/spectrophotometers etc.)?	Y, Balances Only
Is the laboratory pure water quality monitored routinely?	Y
Records of thermometer calibrations	Y
Oven/ incubator /reference temperatures monitored/ and recorded	Y

Who is responsible?

SDWA (Name): **Greg Young, Patrick Marchio, Martha McElfresh**

I. Analytical records:

	SDWA
	Y/N
Are all analytical records necessary to reconstruct the analyses maintained for 3 years?	Y

Are calculations checked by a second analyst/ supervisor?	**Y, only those >MCL**
Where are Quality System records maintained?	**Lab areas**

SDWA
Y/N

J. Does your laboratory have a chain-of-custody program?	**Y**
K. Are records maintained of preservation checks (Verification of preservatives by laboratory personnel)	**Y**

Who provides the preservatives?
SDWA: **Environmental Chemistry Laboratory**

SDWA
Y/N

L. Is there a sample custodian?	**Y**

Name (SDWA): **Rebecca Hill; For Chain-of-Custody: Larry Duffield, alternate is Greg Young**

M. Who is responsible for sampling?

(SDWA): Organization: **Public Water Sytem owner/operators are responsible for sampling for SDWA compliance monitoring. For samples under Chain-of-Custody, a designated sampler must take the sample and deliver it. Designated samplers are county and state sanitarians and OEHS District Engineers.**

Official: **OEHS-Main Office**

Phone No.:**(304) 558-2981**

SDWA
Y/N

N. Is there a written policy for field equipment calibration and maintenance?	**N**
O. Are records maintained of field equipment calibration and maintenance?	**N**
P. Does the laboratory have a written sample rejection policy ?	**Y, QA Manual pg 7 and Appendix G; Method SOPs**
Q. Do samples arrive on ice?	**Y, SDWA**

R. ARE THERE WRITTEN ETHICS POLICIES INCLUDING YEARLY TRAINING AND MANUAL INTEGRATION PROCEDURES? NO. THERE IS A GENERAL "EMPLOYEE CONDUCT" POLICY, DHHR POLICY MEMORANDUM 2108, COPY IN EACH EMPLOYEE'S HANDBOOK

S. ARE TRAINING RECORDS INCLUDING QUALITY SYSTEM RECORDS AVAILABLE? YES. THE QA MANUAL HAS A SIGNATURE PAGE TO INDICATE WHO HAS READ IT. INITIAL DEMONSTRATIONS OF CAPABILITIES SUMMARIES ARE KEPT IN THE OFFICE FOR EACH CHEMIST.

T. ARE INTERNAL REVIEWS CONDUCTED OF TECHNICAL OPERATIONS BY QAO/QC? YES. FIRST EVER REVIEW CONDUCTED WEEK OF JULY 24TH, 2006. COPY OF CHECKLIST AND REPORT MAILED TO YOU.

U. ARE INTERNAL REVIEWS DONE BY MANAGEMENT TO ASSURE QUALITY SYSTEM IS AFFECTIVE AND APPROPRIATE? YES. WE CONDUCT MONTHLY QUALITY ASSURANCE MEETINGS ATTENDED BY LAB STAFF, DIRECTOR, AND ASSOCIATE DIRECTOR. QUALITY ISSUES ARE DISCUSSED AND DOCUMENTED IN MINUTES.

V. COLLECT THE FOLLOWING FILES AND SEND WITH THE PRESURVEY PACKAGE 30 DAYS BEFORE THE INSPECTION TEAM ARRIVES:

FOR EACH METHOD AND ANALYTE FOR WHICH YOUR LABORATORY SEEKS SDWA CERTIFICATON

- **SCORED SUMMARIES FOR LAST THREE PT STUDIES AND SUPPORTING DATA FOR THE LAST STUDY: COPIES OF PT SUMMARIES, COPIES OF SUPPORTING DATA WILL BE U.S. MAILED.**

- **MDL STUDY (SUMMARY TABULATION AND SUPPORTING RAW DATA); COPIES OF MDL STUDY SUMMARIES AND SUPPORTING RAW DATA WILL BE U.S. MAILED**
-

- **INITIAL DEMONSTRATION OF PERFORMANCE/CAPABILITY STUDY (SUMMARY TABULATION AND SUPPORTING RAW DATA); COPIES OF IDC**

SUMMARIES AND SUPPORTING RAW DATA WILL BE U.S. MAILED AND
- CURRENT SOP/S.

METHOD SOP/S AND CERTIFICATION PROGRAM SOP SAVED TO DISC AND U.S. MAILED

QUALITY SYSTEM (QS) DOCUMENTATION:

- CURRENT LABORATORY QUALITY MANUAL (QM). IF MICROBIOLOGY HAS A SEPARATE QM PROVIDE THAT AS WELL;

OUR QA MANUAL SAVED TO DISC AND U.S. MAILED (CHEMISTRY AND MICRO)
- CURRENT QS SOPS (E.G., SAMPLE LOG-IN); AND

LOG-IN PROCEDURE IS FOUND IN APPENDIX G OF QA MANUAL.

- AN EXAMPLE COMPLETED CHAIN OF CUSTODY FORM.

COPY OF C-O-C U.S. MAILED

W. HAVE THE FOLLOWING RECORDS AVAILABLE ON-SITE FOR REVIEW:

- A LISTING OF PROGRAM CODES USED BY THE LABORATORY IN RECORD KEEPING/LOG-IN, I.E., 00083 OR "XYZ" INDICATES SDWA COMPLIANCE SAMPLES AND 00094 OR "NRT" INDICATES NPDES COMPLIANCE SAMPLES, ETC. NO PROGRAM CODES ARE USED. SAMPLES ARE ASSIGNED A UNIQUE SIX DIGIT LAB #, FIRST TWO DIGITS INDICATE YEAR, EXAMPLE: 060001. SDWA CAN BE "PICKED" OUT OF THE LOG BY NOTING THE FOUR CHECK COLUMNS WHERE REPORTS ARE TO BE SENT.
- ADDITIONAL RECORDS FOR ACTUAL COMPLIANCE SAMPLES WILL ALSO BE REQUESTED 2 WEEKS PRIOR TO THE ON-SITE INSPECTION. HAVING THESE RECORDS COLLECTED PRIOR TO THE ACTUAL ON-SITE WILL GREATLY SPEED THE PROCESS AND FACILITATE AN INDEPENDENT DATA AUDIT (TOTAL RECALCULATIONS OF THE RESULTS) BY THE EPA ASSESSORS.

- PROVIDE A LISTING OF ALL LABORATORIES THE STATE LABORATORY UTILIZES FOR COMPLIANCE ANALYSES AND COPIES OF CURRENT SDWA CERTIFICATES FOR THESE LABORATORIES THAT INCLUDES THE CORRESPONDING METHODS AND ANALYTES. NONE "USED" BY OUR LAB.

A LISTING OF LABS WE CERTIFY, COPIES OF CERTIFICATES, AND PARAMETER SHEETS WILL BE U.S. MAILED.

X. ADDITIONAL INFORMATION TO BE PROVIDED:

- ORGANIZATIONS PHONE DIRECTORY. SENT BY U.S. MAIL
- FACILITY FLOOR PLAN. SENT BY U.S. MAIL
- SAFETY EQUIPMENT REQUIRED OF LABORATORY ASSESSORS? NONE REQUIRED

IV. SDWA Sample Containers, Preservation and Holding Times for Regulated Parameters

SDWA (Place A Check or"X" or Fill-In With Other Response/s If Necessary)

Only complete for Methods/Analytes for which the Laboratory seeks SDWA Certification

Parameter/ Method	Preservative	Sample Holding Time	Extract Holding Time and Storage Conditions	Suggested Sample Size	Type o Contai
Metals (except Hg) X	HNO_3 pH<2 X	6 months X		1 L X	**Plastic**
Mercury X	HNO_3 pH<2 X	28 days X		1 L	**Plastic**
Alkalinity X	Cool, 4C X	14 days X		1 L	**Plastic**
Asbestos	Cool, 4C	48 hours		1 L	Plastic
Chloride X	None X	28 days X		1 L	**Plastic**
Residual Disinfectant	none	immediately		200 mL	Plastic
Color	Cool, 4C	48 hours		100 mL	Plastic
Conductivity X	Cool, 4C X	28 days X		1 L	**Plastic**
Cyanide X	Cool, 4C, X Ascorbic acid (if chlorinated), NaOH pH>12	14 days X		1 L X	**Plastic**
Fluoride X	None X	1 month X		1 L	**Plastic**
Foaming Agents	Cool, 4C	48 hours			
Nitrate X (chlorinated)	Cool, 4C X non-acidified	14 days X		100 mL X	**Plastic**
Nitrate X (non chlorinated)	Cool, 4C, X non-acidified	48 hours X		100 mL X	**Plastic**
Nitrite X	Cool, 4C X	48 hours X		100 mL X	**Plastic**
Nitrate+ Nitrite X	H2SO4 pH<2 X	28 days X		100 mL X	**Plastic**
Odor	Cool, 4C	24 hours		200 mL	Glass
pH X	None X	Immediately X		1 L	**Plastic**
o-Phosphate	Cool, 4C	48 hours		100 mL	Plastic
Silica	Cool, 4C	28 days		100 mL	Plastic
Solids (TDS) X	Cool, 4C X	7 days X		1 L	**Plastic**
Sulfate X	Cool, 4C X	28 days X		1 L	**Plastic**
Temperature	none	immediately		1 L	Plastic

Turbidity X	Cool, 4C X	48 hours X		1 L	Plastic
502.2	Sodium Thiosulfate or Ascorbic Acid, 4C, HCl pH<2	14 days		40-120 mL	Glass w PTFE Lined S
504.1	Sodium Thiosulfate Cool, 4C,	14 days	4C, 24 hours	40 mL	Glass w PTFE Lined S
505	Sodium Thiosulfate Cool, 4C	14 days (7 days for Heptachlor)	4C, 24 hours	40 mL	Glass w PTFE Lined S
506	Sodium Thiosulfate Cool, 4C, Dark	14 days	4C, dark 14 days	1 L	Amber with PTFE Cap
507	Sodium Thiosulfate Cool, 4C, Dark	14 days(see method for exceptions)	4C, dark 14 days	1 L	Amber with P Lined (
508	Sodium Thiosulfate Cool, 4C, Dark	7 days (see method for exceptions)	4C, dark 14 days	1 L	Glass w PTFE Lined (
508A	Cool, 4C	14 days	30 days	1 L	Amber with P Lined (
508.1	Sodium Sulfite HCl pH<2 Cool, 4C	14 days (see method for exceptions)	30 days	1 L	Glass w PTFE Lined (
515.1	Sodium Thiosulfate Cool, 4C, Dark	14 days	4C, dark 28 days	1 L	Amber with P Lined (
515.2	Sodium Thiosulfate or Sodium Sulfite HCl pH<2 Cool, 4C, Dark	14 days	4C, dark 14 days	1 L	Amber with PTFE Cap
515.3	Sodium Thiosulfate Cool, 4C, Dark	14 days	4C, dark 14 days	50 mL	Amber with PTFE Cap
515.4	Sodium Sulfite, dark, cool 10C for first 48 hr. 6C thereafter	14 days	21 days at 0C	40 mL	Amber with PT septum

524.2	Ascorbic Acid or Sodium Thiosulfate HCl pH<2, Cool 4C	14 days		40-120 mL	Glass v PTFE Lined S
525.2	Sodium Sulfite, Dark, Cool, 4C, HCl pH<2	14 days (see method for exceptions)	30 days from collection	1 L	Amber with P' Lined C
531.1, 6610	Sodium Thiosulfate, Monochloroacetic acid, pH<3, Cool, 4C	Cool 4C 28 days		60 mL	Glass v PTFE Lined S
531.2	Sodium Thiosulfate, Potassium Dihydrogen Citrate buffer to pH 4, dark, 10C for first 48 hr, 6C thereafter	28 days		40 mL	Amber with PTFE I Screw C
547	Sodium Thiosulfate Cool, 4C	14 days(18 mo.frozen)		60 mL	Glass v PTFE Lined S
548.1	Sodium Thiosulfate (HCl pH 1.5-2 if high biological activity) Cool, 4C, Dark	7 days	14 days 4C	250 mL	Amber with P' Lined S
549.2	Sodium Thiosulfate, (H_2SO_4 pH<2 if biologically active) Cool, 4C, Dark	7 days	21 days	250mL	High D Amber or Silar Amber
550, 550.1	Sodium Thiosulfate Cool, 4C, HCl pH<2	7 days	550, 30 days 550.1, 40 days Dark, 4C	1 L	Amber with PTFE Cap
551.1	Sodium Sulfite, Ammonium Chloride, pH 4.5-5.0 with phosphate buffer Cool, 4C	14 days		40 mL	Glass v PTFE I Septum

552.1	Ammonium chloride Cool, 4C, Dark	28 days	4C, dark 48 hours	250 mL	Amber with PTFE Cap
552.2	Ammonium chloride Cool, 4C, Dark	14 days	7 days 4C, dark 14 days -10C	50mL	Amber with PTFE Cap
555	Sodium Sulfite HCl, pH 2 Dark, Cool 4C	14 days		100 mL	Glass w PTFE Lined c
1613	Sodium Thiosulfate Cool, 0-4C, Dark		Recommend 40 days	1 L	Amber with PTFE Cap

V. SDWA Approved Methods for Primary Inorganic Chemicals, Parameters in the Lead and Copper Rule, Sodium & Turbidity
[§141.23(k)(1)]

(Place A Check or "X" or Fill-In With Other Response/s If Necessary)

Only complete for Methods/Analytes for which the Laboratory seeks SDWA Certification

Contaminant	Methodology	EPA	ASTM[1]	SM[2]	Other
Antimony X	ICP-MS	200.8[3]			
	Hydride-AA		D3697-92		
	AA-Platform	200.9[3]			
	AA-Furnace X			3113B X	
Arsenic X	ICP	200.7[3]		3120B	
	ICP-MS	200.8[3]			
	AA-Platform	200.9[3]			
	AA-Furnace X		D2972-93C	3113B X	
	Hydride-AA		D2972-93B	3114B	

Asbestos	TEM	100.1[4]			
	TEM	100.2[5]			
Barium **X**	ICP **X**	200.7 **X**		3120B	
	ICP-MS	200.8[3]			
	AA-Direct			3111D	
	AA-Furnace			3113B	
Beryllium **X**	ICP	200.7[3]		3120B	
	ICP-MS	200.8[3]			
	AA-Platform	200.9[3]			
	AA-Furnace **X**		D3645-93B	3113B **X**	
Bromate	IC	300.1[6]			
Cadmium **X**	ICP	200.7[3]			
	ICP-MS	200.8[3]			
	AA-Platform	200.9[3]			
	AA-Furnace **X**			3113B **X**	
Chlorite	IC	300.0[7]			
	IC	300.1[6]			
Chromium **X**	ICP	200.7[3]		3120B	
	ICP-MS	200.8[3]			
	AA-Platform	200.9[3]			
	AA-Furnace **X**			3113B **X**	
Cyanide **X**	Man. Distillation followed by:		D2036-98A	4500-CN-C	
	Spec., Amenable		D2036-98B	4500-CN-G	
	Spec.Manual		D2036-98A	4500-CN-E	I-3300-85[8]
	Semi-auto	335.4[7]			
	Ion Sel. Elec.(ISE) **X**			4500CN-F **X**	
	Lachat				Kenda
Fluoride **X**	Ion Chromatography **X**	300.0[7] **X**	D4327-91	4110B	
	Manual Distillation, SPADNS			4500F-B,D	
	Manual ISE		D1179-93B	4500F-C	
	Automated ISE				380-75WE[9]
	Auto. Alizarin			4500F-E	129-71W[9]
Mercury **X**	Manual Cold Vapor **X**	245.1[3] **X**	D3223-91	3112B	
	Auto. Cold Vapor	245.2[10]			
	ICP-MS	200.8[3]			
Nitrate **X**	Ion Chromatography **X**	300.0[7] **X**	D4327-97	4110B	B-1011[11]
	Auto Cd Reduction **X**	353.2[7] **X**	D3867-90A	4500-NO_3-F	
	Ion Selective Elec.			4500-NO_3-D	601[12]
	Man Cd Reduction		D3867-90B	4500-NO_3-E	
Nitrite **X**	Ion Chromatography **X**	300.0[7] **X**	D4327-97	4110B	B-1011[11]
	Auto Cd Reduction **X**	353.2[7] **X**	D3867-90A	4500-NO_3-F	

	Man Cd Reduction		D3867-90B	4500-NO_3-E	
	Spectrophotometric			4500-NO_2-B	
Selenium **X**	Hydride-AA		D3859-98A	3114B	
	ICP-MS	200.8[3]			
	AA-Platform	200.9[3]			
	AA-Furnace **X**		D3859-93B	3113B **X**	
Thallium **X**	ICP-MS	200.8[3]			
	AA-Platform **X**	200.9[3] **X**			
Contaminant	**Methodology**	**EPA**	**ASTM[1]**	**SM[2]**	**Other**
Lead **X**	AA-Furnace **X**		D3559-96D	3113B **X**	
	ICP-MS	200.8[3]			
	AA-Platform	200.9[3]			
Copper **X**	AA-Furnace **X**		D1688-90C	3113B **X**	
	AA-Direct **X**		D1688-90A	3111B **X**	
	ICP	200.7[3]		3120B	
	ICP-MS	200.8[3]			
	AA-Platform	200.9[3]			
pH **X**	Electrometric	150.1[10] **X**	D1293-84	4500-H^+-B	
		150.2[10]			
Conductivity **X**	Conductance **X**		D1125-91A	2510B **X**	
Calcium **X**	EDTA titration			3500-Ca-B[2a]	
	EDTA titration **X**		D511-93A	3500-Ca-D[2a] **X**	
	AA-Direct		D511-93B	3111B	
	ICP	200.7[3]		3120B	
Alkalinity **X**	Titration **X**		D1067-92B	2320B **X**	
	Elec. titration				I-1030-85[8]
Ortho-phosphate unfiltered, no digestion or hydrolysis	Color, automated ascorbic acid	365.1[7]		4500-P-F	
	Color, ascorbic acid		D515-88A	4500-P-E	
	Color, phosphomolybdate				I-1601-85[8]
	AutoSegmented Flow				I-2601-90[8]
	Auto discrete				I-2598-85[8]
	Ion Chromatography	300.0[7]	D4327-97	4110	
Silica	Color, molybdate blue;				I-1700-85[8]
	auto seg. flow				I-2700-85[8]
	Color		D859-88		
	Molybdosilicate			4500-Si-D[2a]	
	Heteropoly blue			4500-Si-E[2a]	
	Auto. molybdate reactive silica			4500-Si F[2a]	
	ICP	200.7[3]		3120B	
Temperature	Thermometric			2550B	

Sodium **X**	ICP	200.7[3]			
	AA-Direct **X**			3111B **X**	
Turbidity **X**	Nephelometric **X**	180.1[7] **X**		2130B	GLI Method 2[13]
	Hach				10133

Footnotes

[1] *Annual Book of ASTM Standards*, Vols. 11.01 and 11.02, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

[2] *Standard Methods for the Examination of Water and Wastewater*, 18th, 19th or 20th Edition, American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005. Except 3111B, 3111D, 3112B, 3113B, 3114B are not approved in the 20th edition.

[2a] Only approved in 20th edition

[3] "Methods for the Determination of Metals in Environmental Samples - Supplement I," EPA-600/R-94-111, May 1994. Available at NTIS, PB 94-184942.

[4] Method 100.1, "Analytical Method for Determination of Asbestos Fibers in Water," EPA-600/4-83-043, EPA, September 1983. Available at NTIS, PB 83-260471.

[5] Method 100.2, "Determination of Asbestos Structure Over 10- m In Length in Drinking Water," EPA-600/R-94-134, June 1994. Available at NTIS, PB 94-201902.

[6] Methods for the Determination of Organic and Inorganic Compounds in Drinking Water - Volume 1," document number EPA 815-R-00-014, August 2000.

[7] "Methods for the Determination of Inorganic Substances in Environmental Samples," EPA-600/R-93-100, August 1993. Available at NTIS, PB94-121811.

[8] Available from Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225-0425.

[9] Industrial Method No. 129-71W, "Fluoride in Water and Wastewater," December 1972, and Method No. 380-75WE, "Fluoride in Water and Wastewater," February 1976, Technicon Industrial Systems, Tarrytown, NY 10591.

[10] Methods 150.1, 150.2 and 245.2 are available from US EPA, NERL, Cincinnati, OH 45268. The identical methods were formerly in "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020, March 1983.

[11] Method B-1011, "Waters Test Method for Determination of Nitrite/Nitrate in Water Using Single Column Ion Chromatography," Millipore Corporation, Waters Chromatography Division, 34 Maple Street, Milford, MA 01757.

[12] Technical Bulletin 601 "Standard Method of Test for Nitrate in Drinking Water," July 1994, PN 221890-001, Thermo Orion, 500 Cummins Center, Beverly, MA 01915-9846. This method is identical to Orion WeWWG/5880, which is approved for nitrate analysis. ATI Orion republished the method in 1994, and renumbered it as 601, because the 1985 manual "Orion Guide to Water and Wastewater Analysis," which contained WeWWG/5880, is no longer available.

[13] GLI Method 2, "Turbidity," November 2, 1992, GLI International, 9020 W Dean Rd. Milwaukee, Wisconsin 53224.

VI. SDWA Approved Methods for Primary Organic Chemicals [§141.24(e)]

(Place a Check or "X" or Enter Response/s if Necessary)

Only complete for Methods/Analytes for which the Laboratory seeks SDWA Certification

Contaminant	Method[1] (Revision Number)
Benzene	502.2(2.1), 524.2(4.1)
Carbon tetrachloride	502.2(2.1), 524.2(4.1), 551.1(1.0)
Chlorobenzene	502.2(2.1), 524.2(4.1)

1,2-Dichlorobenzene	502.2(2.1), 524.2(4.1)
1,4-Dichlorobenzene	502.2(2.1), 524.2(4.1)
1,2-Dichloroethane	502.2(2.1), 524.2(4.1)
cis-1,2-Dichloroethylene	502.2(2.1), 524.2(4.1)
trans-1,2-Dichloroethylene	502.2(2.1), 524.2(4.1)
Dichloromethane	502.2(2.1), 524.2(4.1)
1,2-Dichloropropane	502.2(2.1), 524.2(4.1)
Ethylbenzene	502.2(2.1), 524.2(4.1)
Styrene	502.2(2.1), 524.2(4.1)
Tetrachloroethylene	502.2(2.1), 524.2(4.1), 551.1(1.0)
1,1,1-Trichloroethane	502.2(2.1), 524.2(4.1), 551.1(1.0)
Trichloroethylene	502.2(2.1), 524.2(4.1), 551.1(1.0)
Toluene	502.2(2.1), 524.2(4.1)
1,2,4-Trichlorobenzene	502.2(2.1), 524.2(4.1)
1,1-Dichloroethylene	502.2(2.1), 524.2(4.1)
1,1,2-Trichloroethane	502.2(2.1), 524.2(4.1), 551.1(1.0)
Vinyl chloride	502.2(2.1), 524.2(4.1)
Xylenes (total)	502.2(2.1), 524.2(4.1)
2,3,7,8-TCDD (dioxin)	1613
2,4-D (as acids, salts and esters)	515.1(4.0), 515.2(1.1), 515.3(1.0), 555(1.0), D5317-93, 515.4(1.0)
Alachlor	505(2.1)[1,3], 507(2.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Atrazine	505(2.1)[1,3], 507(2.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Benzo(a)pyrene	525.2(2.0), 550, 550.1
Carbofuran	531.1(3.1), 6610*, 531.2(1.0)
Chlordane	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0)
Dalapon	515.1(4.0), 515.3(1.0), 552.1(1.0), 552.2(1.0), 515.4(1.0)
Di(2-ethylhexyl)adipate	506(1.1), 525.2(2.0)
Di(2-ethylhexyl)phthalate	506(1.1), 525.2(2.0)
Dibromochloropropane (DBCP)	504.1(1.1), 551.1(1.0)
Dinoseb	515.1(4.0),515.2(1.1), 515.3(1.0), 555(1.0), 515.4(1.0)
Diquat	549.2(1.0)
Endothall	548.1(1.0)

Endrin	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Ethylene dibromide (EDB)	504.1(1.1), 551.1(1.0)
Glyphosate	547, 6651*
Heptachlor	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Heptachlor Epoxide	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Hexachlorobenzene	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Hexachlorocyclopentadiene	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Lindane	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Methoxychlor	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Oxamyl	531.1(3.1), 6610*, 531.2(1.0)
PCBs (as decachlorobiphenyl)[2] (as Aroclors)	508A(1.0) 505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0)
Pentachlorophenol	515.1(4.0), 515.2(1.1), 515.3(1.0), 525.2(2.0), 555(1.0), D5317-93, 515.4(1.0)
Picloram	515.1(4.0), 515.2(1.1), 515.3(1.0), 555(1.0), D5317-93, 515.4(1.0)
Simazine	505(2.1)[3], 507(2.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
2,4,5-TP (Silvex)	515.1(4.0), 515.2(1.1), 515.3(1.0), 555(1.0), D5317-93, 515.4(1.0)
Toxaphene	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0)
HAA5[4]	552.1(1.0), 552.2(1.0), SM6251*
Total Trihalomethanes	502.2(2.1), 524.2(4.1), 551.1(1.0)

Footnotes

1 Methods 508A, and 515.1 are in Methods for the Determination of Organic Compounds in Drinking Water, EPA-600/4-88-039, December 1988, Revised, July 1991. Methods 547, 550, and 550.1 are in Methods for the Determination of Organic Compounds in Drinking Water - Supplement I, EPA-600-4-90-020, July 1990. Methods 515.2, 524.2, 548.1, 552.1 and 555 are in Methods for the Determination of Organic Compounds in Drinking Water - Supplement II, EPA-600/R-92-129. Methods 502.2, 504.1, 505, 506, 507, 508, 508.1, 515.1, 515.2, 524.2, 525.2, 531.1, 551.1, 552.2 are in Methods for the Determination of Organic Compounds in Drinking Water - Supplement III, EPA 600/R-95/131. Methods 513.3 and 549.2 are in Methods for the Determination of Organic and Inorganic Compounds in Drinking Water - Volume 1, EPA 815-R-00-014, August 2000. Method 1613, Tetra-Through Octa- Chlorinated Dioxins and Furans by Isotopic Dilution HRGC/HRMS, EPA-81/B-94-003, October 1994 These documents are available from the National Technical Information Service, NTIS PB91-231480, PB91-146027, PB92-207703, PB2000-106981 and PB95-104774, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800-553-6847. Method 1613 is available from USEPA Office of Water Resource Center (RC-4100), 401 M. Street S.W., Washington,

D.C. 20460. The phone number is 202-260-7786. * Methods 6251, 6651 and 6610 are contained in the currently approved editions of *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.
2 PCBs are qualitatively identified as Aroclors and measured for compliance purposes as decachlorobiphenyl using Method 508A.
3 A nitrogen-phosphorus detector should be substituted for the electron capture detector in Method 505 (or another approved method should be used) to determine alachlor, atrazine and simazine, if lower detection limits are required.
4 The total of monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid and dibromoacetic acid.

VII. SDWA Approved Methods for "Unregulated" Contaminants (§141.40) (Place a Check or "X" or Fill-In Other Responses If Necessary)

Regulations specified in §141.40 require monitoring for certain contaminants to which maximum contaminant levels do not apply. These chemicals are called "unregulated" contaminants, and presently include sulfate, certain volatile organic chemicals (VOCs) and synthetic organic chemicals (SOCs). Analysis for the unregulated VOCs listed under paragraphs (e) and (j) of §141.40 shall be conducted using the following recommended methods, or their equivalent as determined by EPA

These Contaminants are not in the Certification Manual and are not mandated by the EPA .They are optionally listed in state regulations.

"Unregulated" VOC Contaminants	**Method**
Aldicarb	531.1, 6610*
Aldicarb sulfone	531.1, 6610*
Aldicarb sulfoxide	531.1, 6610*
Chloroform	502.2, 524.2, 551, 551.1
Bromodichloromethane	502.2, 524.2, 551, 551.1
Bromoform	502.2, 524.2, 551, 551.1
Chlorodibromomethane	502.2, 524.2, 551, 551.1
Bromobenzene	502.2, 524.2
Bromomethane	502.2, 524.2
Chloroethane	502.2, 524.2
Chloromethane	502.2, 524.2
o-Chlorotoluene	502.2, 524.2
p-Chlorotoluene	502.2, 524.2
Dibromomethane	502.2, 524.2
m-Dichlorobenzene	502.2, 524.2
1,1-Dichloroethane	502.2, 524.2
1,3-Dichloropropane	502.2, 524.2
2,2-Dichloropropane	502.2, 524.2
1,1-Dichloropropene	502.2, 524.2
1,3-Dichloropropene	502.2, 524.2
MTBE(UCMR)	524.2

Nitrobenzene(UCMR)	524.2
1,1,2,2-Tetrachloroethane	502.2, 524.2
1,1,1,2-Tetrachloroethane	502.2, 524.2
1,2,3-Trichloropropane	502.2, 524.2, 504.1

*Standard Methods for Examination of Water and Wastewater, 19th and 20th Editions , American Public Health Association, 1015 Fifteenth St., NW., Washington, DC. 20005

State Discretionary Contaminants	**METHODS**
Bromochloromethane	502.2, 524.2
n-Butylbenzene	502.2, 524.2
sec-Butylbenzene	502.2, 524.2
tert-Butylbenzene	502.2, 524.2
Dichlorodifluoromethane	502.2, 524.2
Fluorotrichloromethane	502.2, 524.2
Hexachlorobutadiene	502.2, 524.2
Isopropylbenzene	502.2, 524.2
p-Isopropyltoluene	502.2, 524.2
Naphthalene	502.2, 524.2
n-Propylbenzene	502.2, 524.2
1,2,3-Trichlorobenzene	502.2, 524.2
1,2,4-Trimethylbenzene	502.2, 524.2
1,3,5-Trimethylbenzene	502.2, 524.2

Supplement 1, EPA-600-4-90-020, July 1990. Methods 515.2, 524, 548.1, 549.1, 552.1 and 555 are in Methods for theDetermination of Organic Compounds in Drinking Water - Supplement II, EPA-600/R-92-129, August 1992. Method 1613, Tetra-Through Octa- Chlorinated Dioxins and Furans by Isotopic Dilution HRGC/HRMS, EPA-81/B-94-003, October 1994. These documents are available from the National Technical Information Service, NTIS PB91-231480, PB91-146027 and PB92- 207703 and PB94-104774, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800-553-7847. Method 1613 is available from US EPA Office of Water Resource Center (RC-4100), 401 M. Street S.W., Washington, D.C. 20460. The phone number is 202-260-7786. EPA Methods 504.1, 508.1 and 525.2 are available from US EPA NERL, Cincinnati, OH 45268. The phone number is (513)- 569-7586

VIII. SDWA Analysis for the 10 unregulated SOCs listed under paragraph (n)(11) of§141.40 shall be conducted using the following recommended methods.

Place A Check or "X" or Fill-In Other Responses If Necessary)

"Unregulated" SOC Contaminants	**Methods**
Aldrin	505, 508, 525.2, 508.1
Butachlor	507, 525.2
Carbaryl	531.1, 6610*
Dicamba	515.1, 515.2, 555
Dieldrin	505, 508, 525.2, 508.1
3-Hydroxycarbofuran	531.1, 6610*
Methomyl	531.1, 6610*
Metolachlor	507, 525.2, 508.1
Metribuzin	507, 525.2, 508.1
Propachlor	508, 525.2, 508.1

*Standard Method 6610 is contained in the Supplement to the 18th edition of *Standard Methods for the Examination of Water and Wastewater*, 1994, American Public Health Association, 1015 Fifteenth Street NW, Washington, DC 20005.

IX. SDWA Analysis for the unregulated inorganic contaminants listed under paragraph (n)(12) of §141.40 shall be conducted using the following recommended methods.

(Place A Check or "X" or Fill-In Other Responses If Necessary)

"Unregulated " Inorganic Contaminants	**"Unregulated" Inorganic**	**Methods EPA**	**ASTM**	**SM**
Nickel	**X**	200.7		3120B
		200.8		
		200.9		
				3111B
				3113B **X**
Sulfate	**X**	300.0 **X**	D4327-91	4110B
		375.2		4500-SO_4 -F
				4500-SO_4 -C,D

X. SWDA Approved Methods for Disinfectant Residuals

(Place A Check or "X" or Fill-In Other Responses If Necessary)

Public water systems need to measure residual disinfectant concentrations with one of the analytical methods in the following table. The methods are contained in the 18th, 19th and 20th editions of *Standard Methods for the Examination of Water and Wastewater.*

Only complete for Methods/Analytes for which the Laboratory seeks SDWA Certification

Residual[1]	Methodology	SM[3]
Free Chlorine[2]	Amperometric Titration	4500-Cl D D 1253-86
	DPD Ferrous Titrimetric	4500-Cl F
	DPD Colorimetric	4500-Cl G
	Syringaldahyde (FACTS)	4500-Cl H
Combined Chlorine (Chloramines)	Amperometric Titration	4500-Cl D D 1253-86
	DPD Ferrous Titrimetric	4500-Cl F
	DPD Colorimetric	4500-Cl G
Total Chlorine[2]	Amperometric Titration	4500-Cl D D 1253-86
	Amperometric Titration (low level measurement)	4500-Cl E
	DPD Ferrous Titrimetric	4500-Cl F
	DPD Colorimetric	4500-Cl G
	Iodometric Electrode	4500-Cl I
Chlorine Dioxide	Amperometric Titration	4500-ClO_2 C[4]
	DPD Method	4500-ClO_2 D
	Amperometric Titration	4500-ClO_2 E
Ozone	Indigo Method	4500-O_3 B

Footnotes

1 If approved by the State, residual disinfectant concentrations for free chlorine and combined chlorine also may be measured by using DPD colorimetric test kits.

2 Free and total chlorine residuals may be measured continuously by adapting a specified chlorine residual method for use with a continuous monitoring instrument provided the chemistry, accuracy, and precision of the measurement remain the same. Instruments used for continuous monitoring need to be calibrated with a grab sample measurement at least every five days, or with protocol approved by the State.

3 *Standard Methods for the Examination of Water and Wastewater*, 18th, 19th or 20th Edition, American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

4 Method 4500-Cl02 is not approved for determining compliance at 141.131(c) because the other two methods are superior.

XI. SDWA Recommended Methods for Secondary Drinking Water Contaminants

(Place A Check or "X" or Fill-In Other Responses If Necessary)

Table IV-5

Analyses of aluminum, chloride, color, fluoride, foaming agents, iron, manganese, odor, silver, sulfate, total dissolved solids (TDS) and zinc to determine compliance under §143.3 may be conducted with the methods in the following table. Criteria for analyzing aluminum, iron, manganese, silver, and zinc samples with digestion or directly without digestion, and other mandatory procedures are contained in Section IV of "Technical Notes on Drinking Water Methods" EPA/600/R-94/173, October 1994. Measurement of pH may be conducted with one of the methods listed above in Section I under "Methods for Inorganic Chemicals."

Contaminant	EPA	ASTM[1]	SM[2]	Other
Aluminum X	200.7[3]		3120B	
	200.8[3]		3113B X	
	200.9[3]		3111D	
Chloride X	300.0[4] X	D4327-91	4110B	
		D512-89B	4500-Cl^-B,-D	
Color			2120B	
Fluoride X	300.0 X	D4327-91 D1179-93	4110 B 4500-F^- B, C, D, E	380-75WE[11] [1]129-71W[5]
Foaming Agents			5540C	
Iron X	200.7[3]		3120B	
	200.9[3]		3111B X	
			3113B	
Manganese X	200.7[3]		3120B	
	200.8[3]		3111B X	
	200.9[3]		3113B	
Odor			2150B	
Silver X	200.7[3]		3120B	I-3720-85[6]
	200.8[3]		3111B	
	200.9[3]		3113B X	
Sulfate X	300.0[4] X	D4327-91	4110B	

	375.2[4]	D516-90	4500-SO_4-E,-F	
			4500-SO_4-C,D	
TDS X			2540C X	
Zinc X	200.7[3]		3120B	
	200.8[3]		3111B X	

Footnotes

[1] *Annual Book of ASTM Standards*, Vols. 11.01 and 11.02, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.
Standard Methods for the Examination of Water and Wastewater, 18th, 19th or 20th Edition, American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005. Except 3111B, 3111D, 3112B, 3113B, 3114B are not approved in the 20th edition.
[3] "Methods for the Determination of Metals in Environmental Samples - Supplement I," EPA-600/R-94-111, May 1994. Available at NTIS, PB94-184942.
[4] "Methods for the Determination of Inorganic Substances in Environmental Samples," EPA-600/R-93-100, August 1993. Available at NTIS, PB94-121811.
[5] Industrial Method No. 129-71W, "Fluoride in Water and Wastewater," December 1972, and Method No. 380-75WE, "Fluoride in Water and Wastewater," February 1976, Bran and Lubbe, 1025 Busch Parkway Buffalo Grove, IL 60089. (Formerly Technicon Industrial Systems, Tarrytown, NY 10591)
[6] Available from Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225-0425.

11.3 Attachment #3: Example On-site Pre-survey Package Template (General Information and Chemistry) rev. 6/20/06

State Laboratory SDWA Pre-Survey Package (Based on 5th ed. of "Lab Cert. Manual")

(Please complete electronically)

Date: Completed by (name/title): **Larry A. Duffield, Program Manager I**

review Coliform Check list will highlight & work on this Book

Only complete for Methods/Analytes for which the Laboratory seeks SDWA Certification

I. General Information:

A. Name of Laboratory: **Environmental Chemistry Section, Office of Laboratory Services**

B. Address: **4710 Chimney Dr., Suite G, Charleston, WV 25302**

C. Telephone Number: **(304) 965-2694**

D. Name of Laboratory Director: **Dr. Andrea Labik, ScD.**

E. Provide an organizational chart of the laboratory, including any field operations or other internal affiliations to show how the laboratory fits into the general organizational structure.
Indicate SDWA and NPDES related portions of the laboratory organization.

Organization Charts U.S. Mailed

F. List names of principal users of services of the laboratory.
Public Water Systems
Office of Environmental Health Services (OEHS) Engineers
State Sanitarians
County Sanitarians
Private Citizens/Well Owners

G. List laboratory support provided by commercial laboratories, and other State or Federal laboratories
NONE

H. Indicate the approximate number of samples analyzed:

	Microbiology	Chemical

	Approximate Number of Samples/Year	Approximate % of Laboratory Workload/Yr.	Approximate No. Samples/Year Organic/Inorganic		Approximate % of Lab.Workload/Yr. Organic/Inorganic	
SDWA				Samples 187 Tests 212		Samples 41% Tests 23%
NPDES				seems quite close		
RCRA						
Superfund						
Other Monitoring				Samples 269 Tests 708	wells etc ?	Samples 59% Tests 77%

Please provide a listing of any codes used for Sample log-in which indicate the associated program:

There is no specific code to differentiate between SDWA regulatory compliance samples and all "other" types. However, compliance samples can be picked out due to the check columns marked as to where copies of the reports are sent. Copies of compliance samples are sent to four separate offices, more than "other" types of samples.

I. Personnel: Provide an organizational Chart which indicates how the Environmental Analyses Sections fit within the organization and how the lab fits in the larger Department/Bureau, etc.
Organization Charts U.S. Mailed for:
Environmental Chemistry
Office of Laboratory Services
Bureau for Public Health

Also , please complete this chart for all technical personnel, including the laboratory director. Use a separate block for each employee and arrange the presentation to reflect the lines of organizational responsibility for Chemistry and Microbiology.

Personnel (Cont.):

Name	Training		Position	Years of Experience		Identify Current An Performed in Suppor	
						SDWA	NPD
	Degree (Check One)	Major		Present Job	Previous Job		
Andrea M. Labik, Sc.D	X Sc.D. MS BS/BA Assoc. HS	Public Health Microbiology	Director, OLS	6 Yr.,10Mo.	3 Yr., 9 Yr.		
Charlotte J. Billingsley	Ph.D. X MS BS/BA Assoc. HS	Bacteriology	Associate Director	13 Yr.	23 Yr.		
Larry A. Duffield	Ph.D. MS X BS Assoc. HS	Biology	Program Manager I	2 Yr.	20 Yr.		

Greg W. Young	Ph.D. MS X BS Assoc. HS	Chemistry	Chemist II	7 Yr.	3 Yr.	Fluoride, Chloride, Sulfate by 300.0; Nitrate/Nitrite by 353.2; CN by 4500CN-F; TDS; pH; Turbidity; Conductivity; Thallium by 200.9	

Personnel (Cont.):

Name	Training		Position	Years of Experience		Identify Current An Performed in Suppor	
						SDWA	NPD
	Degree (Check One)	Major		Present Job	Previous Job		
Patrick L Marchio	Ph.D. MS X BS Assoc. HS	Biology	Chemist I	1.5 Yr.	4 Yr. Private lab	Regulated Metals by SM3113B, EPA 200.7, SM3111B, EPA 245.1	
Martha McElfresh	Ph.D. MS X BS Assoc. HS	Chemistry	Chemist I	Started June 16,2006	18 Yr. Private Lab	In-training for parameters Greg Young is doing	

Becky Payne this org chart shows her as fluoride ?	Ph.D. MS BS/BA Assoc. X HS		Laboratory Assistant III	12 Yr.	4 Yr.	Alkalinity ; Total and Calcium Hardness; Calcium and Magnesium by titration	
Rebecca Hill	Ph.D. MS BS/BA Assoc. X HS		Office Assistant II	5 Yr.		Sample Receiving, Log-in, Tracking, Reporting	

Personnel (Cont.):

Name	Training		Position	Years of Experience		Identify Current An Performed in Suppor SDWA	NPD
	Degree (Check One)	Major		Present Job	Previous Job		
	Ph.D. MS BS/BA Assoc. HS						

	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						

Personnel (Cont.):

Name	Training		Position	Years of Experience		Identify Current An Performed in Suppor	
						SDWA	NPD
	Degree (Check One)	Major		Present Job	Previous Job		
	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						
	Ph.D. MS BS/BA Assoc. HS						

III. Quality Assurance Policies and QC Procedures: Chemistry

	SDWA Y/N
A. Is there a Quality Assurance Manual?	Y
B. Is there a Quality Control/ Assurance Officer?	Y, Larry Duffield
Where are the duties of the QCO/QAO described?	Pages 5-6

C. Frequency of

SDWA Y/N	
Duplicate Analyses?	Y
Lab Reagent Blanks	Y
Spike Analyses?	Y
Check Standards?	Y
2nd Source QC Materials for Calibration Verification?	Y
In-House Inspections/Assessment?	N

they do indeed show an in-house audit

D. Records and Control Limits Maintained:

SDWA		
Records Y/N	Limits Y/N	
Duplicate Analyses?	Y	Y
Spike Analyses?	Y	Y
Check Standards?	Y	Y

List analyses for which "No" applies (Items A - D above):
SDWA: **There is no stated frequency in the QA Manual for In- House Systems Audits or In-House Proficiency Tests. Also, frequency and limits of Quality Control testing is specified in method SOPs.**

E. What corrections are taken for failed QC checks?
Duplicate analyses (SDWA): **Corrected via SOP protocol**
Spike Analyses (SDWA): **Corrected via SOP protocol**
Calibration Check Standards: **Corrected via SOP protocol**

SDWA Y/N	
F. Are records maintained of problems and corrective	

G. Calibration Data:

Out of control Spike results?	Y
Out of control Check Standards?	Y
Out of control duplicate results?	Y
Out of control In-House Audits?	N

of all above

SDWA
Y/N

Are instrument calibration data recorded?	Y
Does standard calibration include ≥ 3 standards and a reagent blank?	Y
Is one calibration standard at or below the MCL (SDWA), permit limit (NPDES)?	Y
Do standard concentrations bracket sample concentrations?	Y

List analyses for which "No" applies (Items F - G above):

SDWA: _**No In-House Audit Samples analyzed**_

check the in house audit pkg and see if really has

H. Routine service checks:

SDWA
Y/N

Are routine service checks performed on analytical instruments (balances/spectrophotometers etc.)?	Y, Balances Only
Is the laboratory pure water quality monitored routinely?	Y
Records of thermometer calibrations	Y
Oven/ incubator /reference temperatures monitored/ and recorded	Y

Who is responsible?

SDWA (Name): _**Greg Young, Patrick Marchio, Martha McElfresh**_

I. Analytical records:

SDWA
Y/N

Are all analytical records necessary to reconstruct the analyses maintained for 3 years?	Y
Are calculations checked by a second analyst/ supervisor?	Y, only those >MCL
Where are Quality System records maintained?	Lab areas

SDWA Y/N	
J. Does your laboratory have a chain-of-custody program?	Y
K. Are records maintained of preservation checks (Verification of preservatives by laboratory personnel)	Y

Who provides the preservatives?
SDWA: **Environmental Chemistry Laboratory**

SDWA Y/N	
L. Is there a sample custodian?	Y

Name (SDWA): **Rebecca Hill; For Chain-of-Custody: Larry Duffield, alternate is Greg Young**

M. Who is responsible for sampling?

(SDWA): Organization: **Public Water Sytem owner/operators are responsible for sampling for SDWA compliance monitoring. For samples under Chain-of-Custody, a designated sampler must take the sample and deliver it. Designated samplers are county and state sanitarians and OEHS District Engineers.**

Official: **OEHS-Main Office**

Phone No.:**(304) 558-2981**

SDWA Y/N	
N. Is there a written policy for field equipment calibration and maintenance?	N
O. Are records maintained of field equipment calibration and maintenance?	N

P. Does the laboratory have a written sample rejection policy ?	Y, QA Manual pg 7 and Appendix G; Method SOPs
Q. Do samples arrive on ice?	Y, SDWA

R. ARE THERE WRITTEN ETHICS POLICIES INCLUDING YEARLY TRAINING AND MANUAL INTEGRATION PROCEDURES? **NO. THERE IS A GENERAL "EMPLOYEE CONDUCT" POLICY, DHHR POLICY MEMORANDUM 2108, COPY IN EACH EMPLOYEE'S HANDBOOK**

S. ARE TRAINING RECORDS INCLUDING QUALITY SYSTEM RECORDS AVAILABLE? **YES. THE QA MANUAL HAS A SIGNATURE PAGE TO INDICATE WHO HAS READ IT. INITIAL DEMONSTRATIONS OF CAPABILITIES SUMMARIES ARE KEPT IN THE OFFICE FOR EACH CHEMIST.**

T. ARE INTERNAL REVIEWS CONDUCTED OF TECHNICAL OPERATIONS BY QAO/QC? **YES. FIRST EVER REVIEW CONDUCTED WEEK OF JULY 24TH, 2006. COPY OF CHECKLIST AND REPORT MAILED TO YOU.**

U. ARE INTERNAL REVIEWS DONE BY MANAGEMENT TO ASSURE QUALITY SYSTEM IS AFFECTIVE AND APPROPRIATE? **YES. WE CONDUCT MONTHLY QUALITY ASSURANCE MEETINGS ATTENDED BY LAB STAFF, DIRECTOR, AND ASSOCIATE DIRECTOR. QUALITY ISSUES ARE DISCUSSED AND DOCUMENTED IN MINUTES.**

V. COLLECT THE FOLLOWING FILES AND SEND WITH THE PRESURVEY PACKAGE 30 DAYS BEFORE THE INSPECTION TEAM ARRIVES:

FOR EACH METHOD AND ANALYTE FOR WHICH YOUR LABORATORY SEEKS SDWA CERTIFICATON

- SCORED SUMMARIES FOR LAST THREE PT STUDIES AND SUPPORTING DATA FOR THE LAST STUDY: **COPIES OF PT SUMMARIES, COPIES OF SUPPORTING DATA WILL BE U.S. MAILED.**
- MDL STUDY (SUMMARY TABULATION AND SUPPORTING RAW DATA); **COPIES OF MDL STUDY SUMMARIES AND SUPPORTING RAW DATA WILL BE U.S. MAILED**
- INITIAL DEMONSTRATION OF PERFORMANCE/CAPABILITY STUDY (SUMMARY TABULATION AND SUPPORTING RAW DATA); **COPIES OF IDC SUMMARIES AND SUPPORTING RAW DATA WILL BE U.S. MAILED** AND
- CURRENT SOP/S.

METHOD SOP/S AND CERTIFICATION PROGRAM SOP SAVED TO DISC AND U.S. MAILED

QUALITY SYSTEM (QS) DOCUMENTATION:

- CURRENT LABORATORY QUALITY MANUAL (QM). IF MICROBIOLOGY HAS A SEPARATE QM PROVIDE THAT AS WELL;
OUR QA MANUAL SAVED TO DISC AND U.S. MAILED (CHEMISTRY AND MICRO)
- CURRENT QS SOPS (E.G., SAMPLE LOG-IN); AND
LOG-IN PROCEDURE IS FOUND IN APPENDIX G OF QA MANUAL.

- AN EXAMPLE COMPLETED CHAIN OF CUSTODY FORM.
COPY OF C-O-C U.S. MAILED

W. HAVE THE FOLLOWING RECORDS AVAILABLE ON-SITE FOR REVIEW:

- A LISTING OF PROGRAM CODES USED BY THE LABORATORY IN RECORD KEEPING/LOG-IN, I.E., 00083 OR "XYZ" INDICATES SDWA COMPLIANCE SAMPLES AND 00094 OR "NRT" INDICATES NPDES COMPLIANCE SAMPLES, ETC.
NO PROGRAM CODES ARE USED. SAMPLES ARE ASSIGNED A UNIQUE SIX DIGIT LAB #, FIRST TWO DIGITS INDICATE YEAR, EXAMPLE: 060001. SDWA CAN BE "PICKED" OUT OF THE LOG BY NOTING THE FOUR CHECK COLUMNS WHERE REPORTS ARE TO BE SENT.
- ADDITIONAL RECORDS FOR ACTUAL COMPLIANCE SAMPLES WILL ALSO BE REQUESTED 2 WEEKS PRIOR TO THE ON-SITE INSPECTION. HAVING THESE RECORDS COLLECTED PRIOR TO THE ACTUAL ON-SITE WILL GREATLY SPEED THE PROCESS AND FACILITATE AN INDEPENDENT DATA AUDIT (TOTAL RECALCULATIONS OF THE RESULTS) BY THE EPA ASSESSORS.

- PROVIDE A LISTING OF ALL LABORATORIES THE STATE LABORATORY UTILIZES FOR COMPLIANCE ANALYSES AND COPIES OF CURRENT SDWA CERTIFICATES FOR THESE LABORATORIES THAT INCLUDES THE CORRESPONDING METHODS AND ANALYTES. **NONE "USED" BY OUR LAB. A LISTING OF LABS WE CERTIFY, COPIES OF CERTIFICATES, AND PARAMETER SHEETS WILL BE U.S. MAILED.**

X. ADDITIONAL INFORMATION TO BE PROVIDED:

- ORGANIZATIONS PHONE DIRECTORY. **SENT BY U.S. MAIL**
- FACILITY FLOOR PLAN. **SENT BY U.S. MAIL**
- SAFETY EQUIPMENT REQUIRED OF LABORATORY ASSESSORS? **NONE REQUIRED**

IV. SDWA Sample Containers, Preservation and Holding Times for Regulated Parameters

SDWA (Place A Check or "X" or Fill-In With Other Response/s If Necessary)

Only complete for Methods/Analytes for which the Laboratory seeks SDWA Certification

Parameter/ Method	Preservative	Sample Holding Time	Extract Holding Time and Storage Conditions	Suggested Sample Size	Type Cont
Metals (except Hg) X	HNO_3 pH<2 X	6 months X		1 L X	Plasti
Mercury X	HNO_3 pH<2 X	28 days X		1 L	Plasti
Alkalinity X	Cool, 4C X	14 days X		1 L	Plasti
Asbestos	Cool, 4C	48 hours		1 L	Plasti
Chloride X	None X	28 days X		1 L	Plasti

Residual Disinfectant	none	immediately		200 mL	Plasti
Color	Cool, 4C	48 hours		100 mL	Plasti
Conductivity X	Cool, 4C X	28 days X		1 L	Plasti
Cyanide X	Cool, 4C, X Ascorbic acid (if chlorinated), NaOH pH>12	14 days X		1 L X	Plasti
Fluoride X	None X	1 month X		1 L	Plasti
Foaming Agents	Cool, 4C	48 hours			
Nitrate X (chlorinated)	Cool, 4C X non-acidified	14 days X		100 mL X	Plasti
Nitrate X (non chlorinated)	Cool, 4C, X non-acidified	48 hours X		100 mL X	Plasti
Nitrite X	Cool, 4C X	48 hours X		100 mL X	Plasti
Nitrate+ Nitrite X	H2SO4 pH<2 X	28 days X		100 mL X	Plasti
Odor	Cool, 4C	24 hours		200 mL	Glass
pH X	None X	Immediately X		1 L	Plasti
o-Phosphate	Cool, 4C	48 hours		100 mL	Plasti
Silica	Cool, 4C	28 days		100 mL	Plasti
Solids (TDS) X	Cool, 4C X	7 days X		1 L	Plasti
Sulfate X	Cool, 4C X	28 days X		1 L	Plasti
Temperature	none	immediately		1 L	Plasti
Turbidity X	Cool, 4C X	48 hours X		1 L	Plasti
502.2	Sodium Thiosulfate or Ascorbic Acid, 4C, HCl pH<2	14 days		40-120 mL	Glass PTFE Lined
504.1	Sodium Thiosulfate Cool, 4C,	14 days	4C, 24 hours	40 mL	Glass PTFE Lined
505	Sodium Thiosulfate Cool, 4C	14 days (7 days for Heptachlor)	4C, 24 hours	40 mL	Glass PTFE Lined

506	Sodium Thiosulfate Cool, 4C, Dark	14 days	4C, dark 14 days	1 L	Ambe with PTFE Cap
507	Sodium Thiosulfate Cool, 4C, Dark	14 days(see method for exceptions)	4C, dark 14 days	1 L	Ambe with Lined
508	Sodium Thiosulfate Cool, 4C, Dark	7 days (see method for exceptions)	4C, dark 14 days	1 L	Glass PTFE Lined
508A	Cool, 4C	14 days	30 days	1 L	Ambe with Lined
508.1	Sodium Sulfite HCl pH<2 Cool, 4C	14 days (see method for exceptions)	30 days	1 L	Glass PTFE Lined
515.1	Sodium Thiosulfate Cool, 4C, Dark	14 days	4C, dark 28 days	1 L	Ambe with Lined
515.2	Sodium Thiosulfate or Sodium Sulfite HCl pH<2 Cool, 4C, Dark	14 days	4C, dark 14 days	1 L	Ambe with PTFE Cap
515.3	Sodium Thiosulfate Cool, 4C, Dark	14 days	4C, dark 14 days	50 mL	Ambe with PTFE Cap
515.4	Sodium Sulfite, dark, cool 10C for first 48 hr. 6C thereafter	14 days	21 days at 0C	40 mL	Ambe with I septu
524.2	Ascorbic Acid or Sodium Thiosulfate HCl pH<2, Cool 4C	14 days		40-120 mL	Glass PTFE Lined
525.2	Sodium Sulfite, Dark, Cool, 4C, HCl pH<2	14 days (see method for exceptions)	30 days from collection	1 L	Ambe with Lined
531.1, 6610	Sodium Thiosulfate, Monochloroacetic acid, pH<3, Cool, 4C	Cool 4C 28 days		60 mL	Glass PTFE Lined

531.2	Sodium Thiosulfate, Potassium Dihydrogen Citrate buffer to pH 4, dark, 10C for first 48 hr, 6C thereafter	28 days		40 mL	Ambe with PTFE Screw
547	Sodium Thiosulfate Cool, 4C	14 days(18 mo.frozen)		60 mL	Glass PTFE Lined
548.1	Sodium Thiosulfate (HCl pH 1.5-2 if high biological activity) Cool, 4C, Dark	7 days	14 days 4C	250 mL	Ambe with Lined
549.2	Sodium Thiosulfate, (H_2SO_4 pH<2 if biologically active) Cool, 4C, Dark	7 days	21 days	250mL	High Ambe or Sil Ambe
550, 550.1	Sodium Thiosulfate Cool, 4C, HCl pH<2	7 days	550, 30 days 550.1, 40 days Dark, 4C	1 L	Ambe with PTFE Cap
551.1	Sodium Sulfite, Ammonium Chloride, pH 4.5-5.0 with phosphate buffer Cool, 4C	14 days		40 mL	Glass PTFE Septu
552.1	Ammonium chloride Cool, 4C, Dark	28 days	4C, dark 48 hours	250 mL	Ambe with PTFE Cap
552.2	Ammonium chloride Cool, 4C, Dark	14 days	7 days 4C, dark 14 days -10C	50mL	Ambe with PTFE Cap
555	Sodium Sulfite HCl, pH 2 Dark, Cool 4C	14 days		100 mL	Glass PTFE Lined
1613	Sodium Thiosulfate Cool, 0-4C, Dark		Recommend 40 days	1 L	Ambe with PTFE Cap

V. SDWA Approved Methods for Primary Inorganic Chemicals, Parameters in the Lead and Copper Rule, Sodium & Turbidity
[§141.23(k)(1)]

(Place A Check or "X" or Fill-In With Other Response/s If Necessary)

Only complete for Methods/Analytes for which the Laboratory seeks SDWA Certification

Contaminant	Methodology	EPA	ASTM[1]	SM[2]	Other
Antimony X	ICP-MS	200.8[3]			
	Hydride-AA		D3697-92		
	AA-Platform	200.9[3]			
	AA-Furnace X			3113B X	
Arsenic X	ICP	200.7[3]		3120B	
	ICP-MS	200.8[3]			
	AA-Platform	200.9[3]			
	AA-Furnace X		D2972-93C	3113B X	
	Hydride-AA		D2972-93B	3114B	
Asbestos	TEM	100.1[4]			
	TEM	100.2[5]			
Barium X	ICP X	200.7 X		3120B	
	ICP-MS	200.8[3]			
	AA-Direct			3111D	
	AA-Furnace			3113B	
Beryllium X	ICP	200.7[3]		3120B	
	ICP-MS	200.8[3]			
	AA-Platform	200.9[3]			
	AA-Furnace X		D3645-93B	3113B X	
Bromate	IC	300.1[6]			
Cadmium X	ICP	200.7[3]			
	ICP-MS	200.8[3]			
	AA-Platform	200.9[3]			
	AA-Furnace X			3113B X	
Chlorite	IC	300.0[7]			
	IC	300.1[6]			
Chromium X	ICP	200.7[3]		3120B	

	ICP-MS	200.8[3]			
	AA-Platform	200.9[3]			
	AA-Furnace X			3113B X	
Cyanide X	Man. Distillation followed by:		D2036-98A	4500-CN-C	
	Spec., Amenable		D2036-98B	4500-CN-G	
	Spec.Manual		D2036-98A	4500-CN-E	I-3300-85[8]
	Semi-auto	335.4[7]			
	Ion Sel. Elec.(ISE) X			4500CN-F X	
	Lachat				Kenda
Fluoride X	Ion Chromatography X	300.0[7] X	D4327-91	4110B	
	Manual Distillation, SPADNS			4500F-B,D	
	Manual ISE		D1179-93B	4500F-C	
	Automated ISE				380-75WE[9]
	Auto. Alizarin			4500F-E	129-71W[9]
Mercury X	Manual Cold Vapor X	245.1[3] X	D3223-91	3112B	
	Auto. Cold Vapor	245.2[10]			
	ICP-MS	200.8[3]			
Nitrate X	Ion Chromatography X	300.0[7] X	D4327-97	4110B	B-1011[11]
	Auto Cd Reduction X	353.2[7] X	D3867-90A	4500-NO_3-F	
	Ion Selective Elec.			4500-NO_3-D	601[12]
	Man Cd Reduction		D3867-90B	4500-NO_3-E	
Nitrite X	Ion Chromatography X	300.0[7] X	D4327-97	4110B	B-1011[11]
	Auto Cd Reduction X	353.2[7] X	D3867-90A	4500-NO_3-F	
	Man Cd Reduction		D3867-90B	4500-NO_3-E	
	Spectrophotometric			4500-NO_2-B	
Selenium X	Hydride-AA		D3859-98A	3114B	
	ICP-MS	200.8[3]			
	AA-Platform	200.9[3]			
	AA-Furnace X		D3859-93B	3113B X	
Thallium X	ICP-MS	200.8[3]			
	AA-Platform X	200.9[3] X			
Contaminant	**Methodology**	**EPA**	**ASTM[1]**	**SM[2]**	**Other**
Lead X	AA-Furnace X		D3559-96D	3113B X	
	ICP-MS	200.8[3]			
	AA-Platform	200.9[3]			
Copper X	AA-Furnace X		D1688-90C	3113B X	
	AA-Direct X		D1688-90A	3111B X	
	ICP	200.7[3]		3120B	
	ICP-MS	200.8[3]			
	AA-Platform	200.9[3]			
pH X	Electrometric	150.1[10] X	D1293-84	4500-H^+-B	
		150.2[10]			
Conductivity X	Conductance X		D1125-91A	2510B X	

Calcium X	EDTA titration			3500-Ca-B[2a]	
	EDTA titration X		D511-93A	3500-Ca-D[2a] X	
	AA-Direct		D511-93B	3111B	
	ICP	200.7[3]		3120B	
Alkalinity X	Titration X		D1067-92B	2320B X	
	Elec. titration				I-1030-85[8]
Ortho-phosphate unfiltered, no digestion or hydrolysis	Color, automated ascorbic acid	365.1[7]		4500-P-F	
	Color, ascorbic acid		D515-88A	4500-P-E	
	Color, phosphomolybdate				I-1601-85[8]
	AutoSegmented Flow				I-2601-90[8]
	Auto discrete				I-2598-85[8]
	Ion Chromatography	300.0[7]	D4327-97	4110	
Silica	Color, molybdate blue;				I-1700-85[8]
	auto seg. flow				I-2700-85[8]
	Color		D859-88		
	Molybdosilicate			4500-Si-D[2a]	
	Heteropoly blue			4500-Si-E[2a]	
	Auto. molybdate reactive silica			4500-Si F[2a]	
	ICP	200.7[3]		3120B	
Temperature	Thermometric			2550B	
Sodium X	ICP	200.7[3]			
	AA-Direct X			3111B X	
Turbidity X	Nephelometric X	180.1[7] X		2130B	GLI Method
	Hach				10133

Footnotes

[1] *Annual Book of ASTM Standards*, Vols. 11.01 and 11.02, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

[2] *Standard Methods for the Examination of Water and Wastewater*, 18th, 19th or 20th Edition, American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005. Except 3111B, 3111D, 3112B, 3113B, 3114B are not approved in the 20th edition.

[2a] Only approved in 20th edition

[3] "Methods for the Determination of Metals in Environmental Samples - Supplement I," EPA-600/R-94-111, May 1994. Available at NTIS, PB 94-184942.

[4] Method 100.1, "Analytical Method for Determination of Asbestos Fibers in Water," EPA-600/4-83-043, EPA, September 1983. Available at NTIS, PB 83-260471.

[5] Method 100.2, "Determination of Asbestos Structure Over 10- m In Length in Drinking Water," EPA-600/R-94-134, June 1994. Available at NTIS, PB 94-201902.

[6] Methods for the Determination of Organic and Inorganic Compounds in Drinking Water - Volume 1," document number EPA 815-R-00-014, August 2000.

[7] "Methods for the Determination of Inorganic Substances in Environmental Samples," EPA-600/R-93-100, August 1993. Available at NTIS, PB94-121811.

[8] Available from Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225-0425.

[9] Industrial Method No. 129-71W, "Fluoride in Water and Wastewater," December 1972, and Method No. 380-75WE, "Fluoride in Water and Wastewater," February 1976, Technicon Industrial Systems, Tarrytown, NY 10591.

[10] Methods 150.1, 150.2 and 245.2 are available from US EPA, NERL, Cincinnati, OH 45268. The identical methods were formerly in "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020, March 1983.

[11] Method B-1011, "Waters Test Method for Determination of Nitrite/Nitrate in Water Using Single Column Ion Chromatography," Millipore Corporation, Waters Chromatography Division, 34 Maple Street, Milford, MA 01757.

[12] Technical Bulletin 601 "Standard Method of Test for Nitrate in Drinking Water," July 1994, PN 221890-001, Thermo Orion, 500 Cummins Center, Beverly, MA 01915-9846. This method is identical to Orion WeWWG/5880, which is approved for nitrate analysis. ATI Orion republished the method in 1994, and renumbered it as 601, because the 1985 manual "Orion Guide to Water and Wastewater Analysis," which contained WeWWG/5880, is no longer available.

[13] GLI Method 2, "Turbidity," November 2, 1992, GLI International, 9020 W Dean Rd. Milwaukee, Wisconsin 53224.

VI. SDWA Approved Methods for Primary Organic Chemicals [§141.24(e)]

(Place a Check or "X" or Enter Response/s if Necessary)

Only complete for Methods/Analytes for which the Laboratory seeks SDWA Certification

Contaminant	Method[1] (Revision Number)
Benzene	502.2(2.1), 524.2(4.1)
Carbon tetrachloride	502.2(2.1), 524.2(4.1), 551.1(1.0)
Chlorobenzene	502.2(2.1), 524.2(4.1)
1,2-Dichlorobenzene	502.2(2.1), 524.2(4.1)
1,4-Dichlorobenzene	502.2(2.1), 524.2(4.1)
1,2-Dichloroethane	502.2(2.1), 524.2(4.1)
cis-1,2-Dichloroethylene	502.2(2.1), 524.2(4.1)
trans-1,2-Dichloroethylene	502.2(2.1), 524.2(4.1)
Dichloromethane	502.2(2.1), 524.2(4.1)
1,2-Dichloropropane	502.2(2.1), 524.2(4.1)
Ethylbenzene	502.2(2.1), 524.2(4.1)
Styrene	502.2(2.1), 524.2(4.1)
Tetrachloroethylene	502.2(2.1), 524.2(4.1), 551.1(1.0)
1,1,1-Trichloroethane	502.2(2.1), 524.2(4.1), 551.1(1.0)
Trichloroethylene	502.2(2.1), 524.2(4.1), 551.1(1.0)
Toluene	502.2(2.1), 524.2(4.1)
1,2,4-Trichlorobenzene	502.2(2.1), 524.2(4.1)
1,1-Dichloroethylene	502.2(2.1), 524.2(4.1)
1,1,2-Trichloroethane	502.2(2.1), 524.2(4.1), 551.1(1.0)
Vinyl chloride	502.2(2.1), 524.2(4.1)
Xylenes (total)	502.2(2.1), 524.2(4.1)
2,3,7,8-TCDD (dioxin)	1613
2,4-D (as acids, salts and esters)	515.1(4.0), 515.2(1.1), 515.3(1.0), 555(1.0), D5317-93, 515.4(1.0)

Alachlor	505(2.1)[1,3], 507(2.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Atrazine	505(2.1)[1,3], 507(2.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Benzo(a)pyrene	525.2(2.0), 550, 550.1
Carbofuran	531.1(3.1), 6610*, 531.2(1.0)
Chlordane	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0)
Dalapon	515.1(4.0), 515.3(1.0), 552.1(1.0), 552.2(1.0), 515.4(1.0)
Di(2-ethylhexyl)adipate	506(1.1), 525.2(2.0)
Di(2-ethylhexyl)phthalate	506(1.1), 525.2(2.0)
Dibromochloropropane (DBCP)	504.1(1.1), 551.1(1.0)
Dinoseb	515.1(4.0),515.2(1.1), 515.3(1.0), 555(1.0), 515.4(1.0)
Diquat	549.2(1.0)
Endothall	548.1(1.0)
Endrin	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Ethylene dibromide (EDB)	504.1(1.1), 551.1(1.0)
Glyphosate	547, 6651*
Heptachlor	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Heptachlor Epoxide	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Hexachlorobenzene	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Hexachlorocyclopentadiene	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Lindane	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Methoxychlor	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
Oxamyl	531.1(3.1), 6610*, 531.2(1.0)
PCBs (as decachlorobiphenyl)[2] (as Aroclors)	508A(1.0) 505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0)
Pentachlorophenol	515.1(4.0), 515.2(1.1), 515.3(1.0), 525.2(2.0), 555(1.0), D5317-93, 515.4(1.0)
Picloram	515.1(4.0), 515.2(1.1), 515.3(1.0), 555(1.0), D5317-93, 515.4(1.0)

Simazine	505(2.1)[3], 507(2.1), 508.1(2.0), 525.2(2.0), 551.1(1.0)
2,4,5-TP (Silvex)	515.1(4.0), 515.2(1.1), 515.3(1.0), 555(1.0), D5317-93, 515.4(1.0)
Toxaphene	505(2.1), 508(3.1), 508.1(2.0), 525.2(2.0)
HAA5[4]	552.1(1.0), 552.2(1.0), SM6251*
Total Trihalomethanes	502.2(2.1), 524.2(4.1), 551.1(1.0)

Footnotes

1 Methods 508A, and 515.1 are in Methods for the Determination of Organic Compounds in Drinking Water, EPA-600/4-88-039, December 1988, Revised, July 1991. Methods 547, 550, and 550.1 are in Methods for the Determination of Organic Compounds in Drinking Water - Supplement I, EPA-600-4-90-020, July 1990. Methods 515.2, 524.2, 548.1, 552.1 and 555 are in Methods for the Determination of Organic Compounds in Drinking Water - Supplement II, EPA-600/R-92-129. Methods 502.2, 504.1, 505, 506, 507, 508, 508.1, 515.1, 515.2, 524.2, 525.2, 531.1, 551.1, 552.2 are in Methods for the Determination of Organic Compounds in Drinking Water - Supplement III, EPA 600/R-95/131. Methods 513.3 and 549.2 are in Methods for the Determination of Organic and Inorganic Compounds in Drinking Water - Volume 1, EPA 815-R-00-014, August 2000. Method 1613, Tetra-Through Octa- Chlorinated Dioxins and Furans by Isotopic Dilution HRGC/HRMS, EPA-81/B-94-003, October 1994 These documents are available from the National Technical Information Service, NTIS PB91-231480, PB91-146027, PB92-207703, PB2000-106981 and PB95-104774, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800-553-6847. Method 1613 is available from USEPA Office of Water Resource Center (RC-4100), 401 M. Street S.W., Washington, D.C. 20460. The phone number is 202-260-7786. * Methods 6251, 6651 and 6610 are contained in the currently approved editions of *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

2 PCBs are qualitatively identified as Aroclors and measured for compliance purposes as decachlorobiphenyl using Method 508A.

3 A nitrogen-phosphorus detector should be substituted for the electron capture detector in Method 505 (or another approved method should be used) to determine alachlor, atrazine and simazine, if lower detection limits are required.

4 The total of monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, monobromoacetic acid and dibromoacetic acid.

VII. SDWA Approved Methods for "Unregulated" Contaminants (§141.40)

(Place a Check or "X" or Fill-In Other Responses If Necessary)

Regulations specified in §141.40 require monitoring for certain contaminants to which maximum contaminant levels do not apply. These chemicals are called "unregulated" contaminants, and presently include sulfate, certain volatile organic chemicals (VOCs) and synthetic organic chemicals (SOCs). Analysis for the unregulated VOCs listed under paragraphs (e) and (j) of §141.40 shall be conducted using the following recommended methods, or their equivalent as determined by EPA

These Contaminants are not in the Certification Manual and are not mandated by the EPA .They are optionally listed in state regulations.

"Unregulated" VOC Contaminants	**Method**
Aldicarb	531.1, 6610*
Aldicarb sulfone	531.1, 6610*
Aldicarb sulfoxide	531.1, 6610*
Chloroform	502.2, 524.2, 551, 551.1
Bromodichloromethane	502.2, 524.2, 551, 551.1
Bromoform	502.2, 524.2, 551, 551.1
Chlorodibromomethane	502.2, 524.2, 551, 551.1
Bromobenzene	502.2, 524.2

Bromomethane	502.2, 524.2
Chloroethane	502.2, 524.2
Chloromethane	502.2, 524.2
o-Chlorotoluene	502.2, 524.2
p-Chlorotoluene	502.2, 524.2
Dibromomethane	502.2, 524.2
m-Dichlorobenzene	502.2, 524.2
1,1-Dichloroethane	502.2, 524.2
1,3-Dichloropropane	502.2, 524.2
2,2-Dichloropropane	502.2, 524.2
1,1-Dichloropropene	502.2, 524.2
1,3-Dichloropropene	502.2, 524.2
MTBE(UCMR)	524.2
Nitrobenzene(UCMR)	524.2
1,1,2,2-Tetrachloroethane	502.2, 524.2
1,1,1,2-Tetrachloroethane	502.2, 524.2
1,2,3-Trichloropropane	502.2, 524.2, 504.1

*Standard Methods for Examination of Water and Wastewater, 19th and 20th Editions , American Public Health Association, 1015 Fifteenth St., NW., Washington, DC. 20005

State Discretionary Contaminants	**METHODS**
Bromochloromethane	502.2, 524.2
n-Butylbenzene	502.2, 524.2
sec-Butylbenzene	502.2, 524.2
tert-Butylbenzene	502.2, 524.2
Dichlorodifluoromethane	502.2, 524.2
Fluorotrichloromethane	502.2, 524.2
Hexachlorobutadiene	502.2, 524.2
Isopropylbenzene	502.2, 524.2
p-Isopropyltoluene	502.2, 524.2
Naphthalene	502.2, 524.2
n-Propylbenzene	502.2, 524.2
1,2,3-Trichlorobenzene	502.2, 524.2
1,2,4-Trimethylbenzene	502.2, 524.2
1,3,5-Trimethylbenzene	502.2, 524.2

Supplement 1, EPA-600-4-90-020, July 1990. Methods 515.2, 524, 548.1, 549.1, 552.1 and 555 are in Methods for theDetermination of Organic Compounds in Drinking Water - Supplement II, EPA-600/R-92-129, August 1992. Method 1613, Tetra-Through Octa- Chlorinated Dioxins and Furans by Isotopic Dilution HRGC/HRMS, EPA-81/B-94-003, October 1994. These documents are available from the National Technical Information Service, NTIS PB91-231480, PB91-146027 and PB92- 207703 and PB94-104774, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800-553-7847. Method 1613 is available from US EPA Office of Water Resource Center (RC-4100), 401 M. Street S.W., Washington, D.C. 20460. The phone number is 202-260-7786. EPA Methods 504.1, 508.1 and 525.2 are available from US EPA NERL, Cincinnati, OH 45268. The phone number is (513)-569-7586

VIII. SDWA Analysis for the 10 unregulated SOCs listed under paragraph (n)(11) of§141.40 shall be conducted using the following recommended methods.

Place A Check or "X" or Fill-In Other Responses If Necessary)

"Unregulated" SOC Contaminants	Methods
Aldrin	505, 508, 525.2, 508.1
Butachlor	507, 525.2
Carbaryl	531.1, 6610*
Dicamba	515.1, 515.2, 555
Dieldrin	505, 508, 525.2, 508.1
3-Hydroxycarbofuran	531.1, 6610*
Methomyl	531.1, 6610*
Metolachlor	507, 525.2, 508.1
Metribuzin	507, 525.2, 508.1
Propachlor	508, 525.2, 508.1

*Standard Method 6610 is contained in the Supplement to the 18th edition of *Standard Methods for the Examination of Water and Wastewater*, 1994, American Public Health Association, 1015 Fifteenth Street NW, Washington, DC 20005.

IX. SDWA Analysis for the unregulated inorganic contaminants listed under paragraph (n)(12) of §141.40 shall be conducted using the following recommended methods.

(Place A Check or "X" or Fill-In Other Responses If Necessary)

"Unregulated " Inorganic Contaminants	"Unregulated" Inorganic	Methods EPA	ASTM	SM
Nickel	X	200.7		3120B

	200.8		
	200.9		
			3111B
			3113B X
Sulfate X	300.0 X	D4327-91	4110B
	375.2		4500-SO$_4$ -F
			4500-SO$_4$ -C,D

X. SWDA Approved Methods for Disinfectant Residuals

(Place A Check or "X" or Fill-In Other Responses If Necessary)

Public water systems need to measure residual disinfectant concentrations with one of the analytical methods in the following table. The methods are contained in the 18th, 19th and 20th editions of *Standard Methods for the Examination of Water and Wastewater.*

Only complete for Methods/Analytes for which the Laboratory seeks SDWA Certification

Residual[1]	Methodology	SM[3]
Free Chlorine[2]	Amperometric Titration	4500-Cl D
		D 1253-86
	DPD Ferrous Titrimetric	4500-Cl F
	DPD Colorimetric	4500-Cl G
	Syringaldahyde (FACTS)	4500-Cl H
Combined Chlorine (Chloramines)	Amperometric Titration	4500-Cl D
		D 1253-86
	DPD Ferrous Titrimetric	4500-Cl F
	DPD Colorimetric	4500-Cl G
Total Chlorine[2]	Amperometric Titration	4500-Cl D
		D 1253-86
	Amperometric Titration (low level measurement)	4500-Cl E
	DPD Ferrous Titrimetric	4500-Cl F
	DPD Colorimetric	4500-Cl G
	Iodometric Electrode	4500-Cl I
Chlorine Dioxide	Amperometric Titration	4500-ClO_2 C[4]
	DPD Method	4500-ClO_2 D
	Amperometric Titration	4500-ClO_2 E
Ozone	Indigo Method	4500-O_3 B

Footnotes

1 If approved by the State, residual disinfectant concentrations for free chlorine and combined chlorine also may be measured by using DPD colorimetric test kits.

2 Free and total chlorine residuals may be measured continuously by adapting a specified chlorine residual method for use with a continuous monitoring instrument provided the chemistry, accuracy, and precision of the measurement remain the same. Instruments used for continuous monitoring need to be calibrated with a grab sample measurement at least every five days, or with protocol approved by the State.

3 *Standard Methods for the Examination of Water and Wastewater*, 18th, 19th or 20th Edition, American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005.

4 Method 4500-Cl02 is not approved for determining compliance at 141.131(c) because the other two methods are superior.

XI. SDWA Recommended Methods for Secondary Drinking Water Contaminants

(Place A Check or "X" or Fill-In Other Responses If Necessary)

Table IV-5

Analyses of aluminum, chloride, color, fluoride, foaming agents, iron, manganese, odor, silver, sulfate, total dissolved solids (TDS) and zinc to determine compliance under §143.3 may be conducted with the methods in the following table. Criteria for analyzing aluminum, iron, manganese, silver, and zinc samples with digestion or directly without digestion, and other mandatory procedures are contained in Section IV of "Technical Notes on Drinking Water Methods" EPA/600/R-94/173, October 1994. Measurement of pH may be conducted with one of the methods listed above in Section I under "Methods for Inorganic Chemicals."

Contaminant	EPA	ASTM[1]	SM[2]	Other
Aluminum X	200.7[3]		3120B	
	200.8[3]		3113B X	
	200.9[3]		3111D	
Chloride X	300.0[4] X	D4327-91	4110B	
		D512-89B	4500-Cl⁻B,-D	
Color			2120B	
Fluoride X	300.0 X	D4327-91 D1179-93	4110 B 4500-F B, C, D, E	380-75WE[11] [1]129-71W[5]
Foaming Agents			5540C	
Iron X	200.7[3]		3120B	
	200.9[3]		3111B X	
			3113B	
Manganese X	200.7[3]		3120B	
	200.8[3]		3111B X	
	200.9[3]		3113B	
Odor			2150B	
Silver X	200.7[3]		3120B	I-3720-85[6]
	200.8[3]		3111B	
	200.9[3]		3113B X	
Sulfate X	300.0[4] X	D4327-91	4110B	
	375.2[4]	D516-90	4500-SO₄-E,-F	
			4500-SO₄-C,D	

TDS X			2540C X	
Zinc X	200.7[3]		3120B	
	200.8[3]		3111B X	

Footnotes

[1] *Annual Book of ASTM Standards*, Vols. 11.01 and 11.02, American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.
Standard Methods for the Examination of Water and Wastewater, 18th, 19th or 20th Edition, American Public Health Association, 1015 Fifteenth Street NW, Washington, D.C. 20005. Except 3111B, 3111D, 3112B, 3113B, 3114B are not approved in the 20th edition.
[3] "Methods for the Determination of Metals in Environmental Samples - Supplement I," EPA-600/R-94-111, May 1994. Available at NTIS, PB94-184942.
[4] "Methods for the Determination of Inorganic Substances in Environmental Samples," EPA-600/R-93-100, August 1993. Available at NTIS, PB94-121811.
[5] Industrial Method No. 129-71W, "Fluoride in Water and Wastewater," December 1972, and Method No. 380-75WE, "Fluoride in Water and Wastewater," February 1976, Bran and Lubbe, 1025 Busch Parkway Buffalo Grove, IL 60089. (Formerly Technicon Industrial Systems, Tarrytown, NY 10591)
[6] Available from Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225-0425.

ELEMENT	ITEM	Y/N/O
1. PERSONNEL		
Supervisor/Consultant	1.1	
Does the supervisor of the microbiology laboratory have a bachelor's degree in microbiology, biology, or equivalent?		Y
Has a supervisor with a degree in a subject other than those listed above had at least one college-level microbiology laboratory course in which environmental microbiology was covered?		O
In addition, has the supervisor had a minimum of two weeks training at a Federal or State agency or academic institution in microbiological analysis of drinking water or 80 hours of on-the-job training in water microbiology at a certified laboratory, or other training acceptable to the State or EPA?		Y
If a supervisor is not available, and a waiver has not been granted as per Section 1.3, is a consultant with the same qualifications substituted?		O
If a supervisor is not available, and a waiver has not been granted as per Section 1.3, is a consultant with the same qualifications substituted?		O
Can the laboratory supervisor demonstrate that all laboratory personnel have the ability to satisfactorily perform the analyses to which they are assigned?		Y
Can the laboratory supervisor demonstrate that all data reported by the laboratory meets the required quality assurance and regulatory criteria?		Y
Analyst (or equivalent job title)	1.2	
Does the analyst have at least a high school education, a minimum of three months bench experience in water, milk or food microbiology, training in microbiological analysis of drinking water acceptable to the State (or EPA), and a minimum of 30 days on-the-job training under an experienced analyst?		Y
Has the analyst demonstrated acceptable results on unknown samples before analyzing compliance samples?		Y
Waiver of Academic Training	1.3	
Has the certification authority waived the need for the above specified academic training for highly experienced analysts in this laboratory?		O
Has the certification authority waived the need for the above specified training for supervisors of laboratories associated with drinking water systems that only analyze samples from that system?		O
If yes to either of the above, does the laboratory have a copy of that written and signed waiver available for inspection?		O
Personnel Records	1.4	
Does the laboratory maintain personnel records on laboratory analysts that include academic background, specialized training courses completed, and types of microbiological analyses conducted?		Y
2. LABORATORY FACILITIES		
Does the laboratory have facilities that are clean and temperature and humidity controlled, and with adequate lighting at the bench tops?		Y
Does the laboratory maintain effective separation of incompatible testing areas?		Y
Does the laboratory control access where appropriate, and minimize traffic flow through the work areas?		Y
Does the laboratory ensure that contamination does not adversely affect data Quality?		Y
Does the laboratory have bench tops and floors that are easily cleaned and disinfected?		Y
Does the laboratory have sufficient space for processing samples; storage space for media, glassware, and portable equipment; floor space for stationary equipment; and areas for cleaning glassware and sterilizing materials?		Y
Does the laboratory have provisions for disposal of microbiological wastes?		Y
3. LABORATORY EQUIPMENT AND SUPPLIES		
Does the laboratory have the equipment and supplies needed to perform the approved methods for which certification has been requested?		Y
pH meter	3.1	
Are accuracy and scale graduations within ±0.1 units?	3.1.1	Y
Are pH buffer aliquots used only once?	3.1.2	Y
Are electrodes maintained according to the manufacturer's recommendations?	3.1.3	Y
QC Are pH meters standardized before each use period with pH 7.0 and either 4.0 or 10.0 standard buffers, whichever covers the desired pH of the media or	3.1.4	Y
QC Are both the date and buffers used recorded in a logbook along with the analyst's initials?		Y
QC Is the pH slope recorded monthly, after calibration?	3.1.5	Y
QC If the pH meter does not have a feature to automatically calculate the slope, but canprovide in the pH in millivolts, is the formula in Section 3.1.5.1 used to calculate the slope?	3.1.5.2	O

ELEMENT	ITEM	Y/N/O
QC If the slope is below 95% or above 105%, are the manufacturer's instructions followed for meter or electrode maintenance and general cleaning?	3.1.6	Y
QC Are commercial pH buffer solutions dated when received and when opened?		Y
QC Are pH buffer solutions discarded by the expiration date?		Y
Balance (top loader or pan)	3.2	
Does the balance have a readability of 0.1 g?	3.2.1	Y
Does the balance have a sensitivity of at least 0.1 g for a load of 150 g, and 1 mg for a load of 10 g or less?	3.2.2	Y
QC Are the balances calibrated monthly using ASTM Class 1, 2, or 3 weights (minimum 3 traceable weights which bracket laboratory weighing needs, with a readability of 0.1 g)?	3.2.3	Y
QC Are non-reference weights calibrated every six months with reference weights?		O
QC Are calibrations recorded in a logbook with the initials of the individual performing the calibration?		Y
QC Are correction values on file and used?		O
QC Are reference weights re-certified every five years?		Y
QC Are damaged or corroded weights replaced?		Y
QC Are service contracts or internal maintenance protocols and maintenance records available?	3.2.4	Y
QC Is maintenance, calibration, and cleaning conducted at least annually by a qualified independent technician, unless the need is modified or waived by the		Y
Temperature Monitoring Device	3.3	
Are glass, dial, or electronic thermometers graduated in 0.5°C increments (0.2°C increments for tests which are incubated at 44.5°C) or less, except as noted for hot air ovens (Section 3.6.1) and refrigerators (Section 3.9.1)?	3.3.1	Y
Does observation of glass thermometers indicate no separation in fluid columns?		Y
Are only dial thermometers which can be adjusted used?		O
QC Are glass and electronic thermometers calibrated annually and dial thermometers quarterly at the temperature used, against a NIST-traceable reference thermometer or one that meets the requirements of NBS Monograph SP 250-23?	3.3.2	Y
QC Are both the calibration factor and calibration date indicated on the		Y
QC Is the following calibration information recorded in a QC record book?		
- Serial number of the laboratory thermometer		Y
- Serial number of the NIST-traceable thermometer (or other reference thermometer)		Y
- Temperature of the laboratory thermometer		Y
- Temperature of the NIST-traceable thermometer (or other reference		Y
- Correction (or calibration) factor		Y
- Date of check		Y
- Analyst's initials		Y
QC Is the thermometer discarded if it differs by more than 1°C from the reference thermometer?	3.3.3	Y
QC Are reference thermometers recalibrated at least every five years?		Y
QC Is reference thermometer calibration documentation maintained?		Y
QC Are continuous recording devices used to monitor incubator temperature recalibrated at least annually, using a reference thermometer that meets the specifications noted in Section 3.3.2?		O
Incubator Unit	3.4	
Do incubator units have an internal temperature monitoring device and maintain a temperature specified by the method used, usually 35°±0.5°C and 44.5°±0.2°C?	3.4.1	Y
For non-portable incubators, are thermometers placed on top and bottom shelves of the use area and immersed in liquid as directed by the manufacturer (except for electronic thermometers)?		Y
When aluminum block incubators are used, do culture dishes and tubes fit snugly?		O
QC Is the calibration-corrected temperature recorded for each thermometer being used at least twice per day during each day the incubator is in use?	3.4.2	Y
QC Are these readings separated by at least four hours?		Y
QC Does the documentation include the date and time of reading, temperature, and technician's initials?		Y
If a circulating water bath is used, is it equipped with a gable cover to ensure an incubation temperature of 44.5°±0.2°C?		Y

ELEMENT	ITEM	Y/N/O
Autoclave	**3.5**	
Does the autoclave have an internal heat source, a temperature gauge with a sensor on the exhaust, a pressure gauge, and an operational safety valve?	3.5.1	Y
Can the autoclave maintain a sterilization temperature during the sterilizing cycle and complete an entire cycle within 45 minutes when a 12-15 minute sterilization period is used?		Y
Does the autoclave depressurize slowly enough to ensure that media will not boil over and bubbles will not form in inverted tubes?		Y
QC Is the following information recorded each time the autoclave is used?	3.5.3	
- Date		Y
- Contents		Y
- Sterilization time and temperature		Y
- Total time in the autoclave		Y
- Analyst's initials		Y
QC Are copies of the service contracts or internal maintenance protocols and maintenance records kept?		Y
QC Is maintenance conducted at least annually?		Y
QC Is a record of the most recent service performed on file and available for inspection?		Y
QC Is a maximum-temperature-registering thermometer, electronic temperature readout device, or continuous recording device used each autoclave cycle to ensure that the proper temperature was reached?	3.5.4	Y
QC Is the temperature recorded?		Y
QC Is overcrowding avoided?		Y
QC Are spore strips or spore ampules used monthly as bioindicators to confirm sterilization?		Y
QC Are automatic timing mechanisms checked quarterly with a stopwatch or other accurate timepiece or time signal, and the results recorded and initialed?	3.5.5	Y
Are autoclave door seals clean and free of caramelized media?	3.5.6	Y
Are autoclave drain screens cleaned frequently and debris removed?		Y
Hot Air Oven	**3.6**	
Does the oven maintain a stable sterilization temperature of 170°-180°C for at least two hours?	3.6.1	O
Is overcrowding avoided?		O
Is the oven thermometer graduated in 10°C increments or less, with the bulb placed in sand during use?		O
QC Is the following information recorded for each cycle?	3.6.2	
- Date		O
- Contents		O
- Sterilization time and temperature		O
- Analyst's initials		O
QC Are spore strips used monthly to confirm sterilization?	3.6.3	O
Colony Counter	**3.7**	
Is a dark field colony counter used to count Heterotrophic Plate Count colonies?		Y
Conductivity Meter	**3.8**	
Are meters suitable for checking laboratory reagent-grade water and readable in units of either micromhos/cm or microsiemens/cm	3.8.1	Y
QC Is the meter calibrated at least monthly, following the manufacturer's recommendations and using an appropriate certified and traceable low-level standard?	3.8.2	Y
QC If the meter cannot be calibrated as noted above, is the cell constant determined at monthly intervals using a method in Standard Methods, Section 2510?		O
Is an in-line unit that cannot be calibrated used to check reagent-grade water?	3.8.3	O
Refrigerator	**3.9**	
Does the refrigerator maintain a temperature of 1°-5°C?	3.9.1	Y
Is the refrigerator thermometer graduated in at least 1°C increments and the thermometer bulb immersed in liquid?		Y
QC On days the refrigerator is in use, and the laboratory is staffed, is the calibrated-corrected temperature recorded at least once per day?	3.9.2	Y
Inoculating Equipment	**3.10**	
Are sterile metal or disposable plastic loops, wood applicator sticks, sterile swabs, or sterile plastic disposable pipet tips used?		Y
Are wood applicator sticks, if used, sterilized by dry heat?		O
Are metal inoculating loops and/or needles made of nickel alloy or platinum?		O
Membrane Filtration (MF) Equipment	**3.11**	
Are MF units made of stainless steel, glass, porcelain, or autoclavable plastic?	3.11.1	Y

ELEMENT	ITEM	Y/N/O
Are they scratched, corroded, or leaking?		N
QC If graduations on clear or plastic funnels are used to measure sample volume, is their accuracy checked with a Class B graduated cylinder or better (or other Class B glassware) and a record of this calibration check retained?	3.11.2	O
Is a 10x to 15x stereo microscope with a fluorescent light source used to count sheen colonies?	3.11.3	Y
Are the membrane filters approved by the manufacturer for total coliform water analysis?	3.11.4	Y
Are membrane filters to be used cellulose ester, white, gridmarked, 47 mm diameter, and 0.45 µm pore size?		Y
If alternate pore sizes are used, does the manufacturer provide performance data equal to or better than the 0.45 µm pore size?		O
Are membrane filters and pads purchased presterilized or autoclaved for 10 minutes at 121°C before use?		Y
QC Is the lot number for membrane filters and the date received recorded?	3.11.5	Y
QC Are the membranes checked to see that they are not brittle or distorted?		Y
QC Are the manufacturer's specification/certification sheets available?		Y
Are the forceps blunt and smooth-tipped without corrugations on the inner sides of the tips?	3.11.6	Y
Culture Dishes (loose or tight lids)	**3.12**	
Are presterilized plastic or sterilizable glass culture dishes used?	3.12.1	Y
Is the sterility of the glass culture dishes maintained by placement in stainless steel or aluminum canisters or a wrap of heavy aluminum foil or char-resistant paper?		Y
Are loose-lid petri dishes incubated in a tight-fitting container with a moistened paper towel?	3.12.2	Y
Are opened packs of disposable culture dishes resealed between use periods?	3.12.3	Y
For membrane filter methods, are culture dishes of an appropriate size to allow the transfer of a single membrane per plate?	3.12.4	Y
Pipets	**3.13**	
Are glass pipets sterilized and maintained in stainless steel or aluminum canisters or wrapped individually in char-resistant paper or aluminum foil?	3.13.1	O
Do pipets have legible markings and are they not chipped or etched?	3.13.2	Y
Are opened packs of disposable sterile pipets resealed between use periods?	3.13.3	Y
Are pipets delivering volumes of 10 mL or less accurate to within a 2.5% tolerance?	3.13.4	Y
Are calibrated micropipetters used with sterile tips?	3.13.5	Y
Are micropipetters calibrated annually and adjusted or replaced if the precision or accuracy is greater than 2.5%?		Y
Glassware and Plasticware	**3.14**	
Is the glassware made of borosilicate glass, or other corrosion-resistant glass, and free of chips and cracks?	3.14.1	Y
Are markings on graduated cylinders and pipets legible?		Y
Are plastic items clear and nontoxic to microorganisms?		Y
QC Are the graduated cylinders used for measurement of sample volumes, or other precalibrated containers that have clearly marked volumes used in lieu of graduated cylinders, accurate to within a 2.5% tolerance?	3.14.2	Y
Are culture tubes and containers containing fermentation medium of sufficient size to contain medium plus sample without being more than three quarters full?	3.14.3	Y
Are tube closures made of stainless steel, plastic, aluminum, or screw caps with nontoxic liners?	3.14.4	Y
Are cotton or foam plugs used?		O
Sample Containers	**3.15**	
Are sample containers wide-mouth plastic or non-corrosive glass bottles with non-leaking ground glass stoppers or caps with nontoxic liners, sterile plastic bags containing sodium thiosulfate, or other appropriate sample containers?	3.15.1	Y
Is sample container capacity at least 120 mL (4 oz) to allow at least a 1-inch head space?		Y
Are glass stoppers covered with aluminum foil or char-resistant paper for sterilization?	3.15.2	O
Are unsterilized glass and plastic bottles sterilized by autoclaving or, alternatively, by dry oven for glass bottles?	3.15.3	Y
Are empty containers moistened with several drops of water before autoclaving to prevent an Aair lock@ sterilization failure?		Y
If chlorinated water is to be analyzed, is sufficient sodium thiosulfate added to the sample bottles before sterilization to neutralize any residual chlorine in the water sample?	3.15.4	Y
Ultraviolet Lamp (If used)	**3.16**	

ELEMENT			ITEM	Y/N/O
Is the germicidal unit disconnected monthly and the lamp cleaned by wiping with soft cloth moistened with ethanol?			3.16.1	O
Is the longwave unit used for fluorometric tests kept clean?				Y
QC Is the germicidal unit tested quarterly with a UV light meter or agar spread plate?			3.16.2	O
QC Is the lamp replaced if it emits less than 70% of its initial output or if an agar spread plate containing 200 to 250 microorganisms, exposed to the UV light for two minutes, does not show a count reduction of 99%?				O
Spectrophotometer or colorimeter (If used)			3.17	
Are wavelengths in the visible range?			3.17.1	O
QC Is a calibration standard and a method-specific blank analyzed every day the instrument is used, prior to sample analysis?			3.17.2	O
QC Is this calibration standard obtained from an outside source?				O
QC Does the calibration standard give a reading in the desired absorbance range?				O
4. GENERAL LABORATORY PRACTICES				
Are laboratory personnel aware of general and customary safety practices for laboratories?				Y
Does the laboratory have a safety plan available?				Y
Does the laboratory keep a copy, and follow the personal protection guidelines, of any material safety data sheet accompanying the receipt of a toxic material?				Y
Sterilization Procedures			4.1	
Does the laboratory follow the minimum times for autoclaving the materials listed below at 121°C?			1.1.1	
- Membrane filters and pads	10 min			O
- Carbohydrate containing media	12-15 min[1]			Y
- Contaminated test materials	30 min[2]			Y
- Membrane filter assemblies	15 min			Y
- Sample collection containers	15 min			Y
- Individual glassware	15 min			Y
- Dilution water blank	15 min			Y
- Rinse water (0.5 - 1 L)	15-30 min[2]			Y
[1] except where otherwise specified by the manufacturer				
[2] time depends upon water volume per container and autoclave load				
Are autoclaved membrane filters and pads and all media removed immediately after completion of the sterilization cycle?			4.1.2	Y
Is membrane filter equipment autoclaved before the beginning of a filtration series?			4.1.3	Y
If a UV light (254 nm) is used to sanitize equipment after initial autoclaving for sterilization, are all supplies presterilized?			4.1.4	O
Sample Containers			4.2	
QC Is at least one sample container selected at random from each batch of sterile sample bottles, or other containers (or lot of commercially available sample containers), and the sterility confirmed by adding 25 mL of a sterile non-selective broth, incubating at 35°±0.5°C, and checking for growth after 24 and 48 hours?				Y
QC Are these results recorded?				Y
QC If growth is detected, is the entire batch resterilized?				Y
Reagent-Grade Water			4.3	
Does the laboratory only use satisfactorily tested reagent water from stills or deionization units to prepare media, reagents, and dilution/rinse water for performing microbial analyses?			4.3.1	Y
- Conductivity	>0.5 megohms resistance or <2 micromhos.cm (microsiemens/cm) at 25°C	Monthly*	4.3.2	Y
- Pb, Cd, Cr, Cu, Ni, Zn	Not greater than 0.05 mg/L per contaminant. Collectively no greater than 0.1 mg/L	Annually		Y
- Total chlorine residual*	<0.1 mg/L	Monthly		Y
- Heterotrophic plate count*	<500/mL CFU/mL*	Monthly		Y
- Bacteriological quality of reagent water*	Ratio of growth rate 0.8 to 3.0	Annually		O
*See Section 4.3.2 for footnotes				
Dilution/Rinse Water			4.4	

ELEMENT	ITEM	Y/N/O
Is stock buffer solution or peptone water prepared as specified in Standard Methods, Section 9050C?	4.4.1	O
Are stock buffers autoclaved or filter-sterilized?	4.4.2	O
Are these containers labeled, dated, and refrigerated?		O
Are stored stock buffers free from turbidity?		O
QC Is each batch (or lot, if commercially prepared) of dilution/rinse water checked for sterility by adding 50 mL of water to 50 mL double strength non-selective broth, incubating at 35°± 0.5°C, and checking for growth after 24 hours and 48 hours?	4.4.3	Y
QC Are these results recorded?		Y
QC Is the batch/lot discarded if growth is detected?		Y
Glassware Washing	**4.5**	
Is distilled or deionized water used for the final rinse?	4.5.1	Y
Is laboratory glassware washed with a detergent designed for laboratory use?	4.5.2	Y
QC Is the glassware inhibitory residue test performed before the initial use of a washing compound and whenever a different formulation, or washing procedure is used?	4.5.3	Y
QC Are these results recorded?		Y
QC Is each batch of dry glassware used for microbial analysis spot-checked for pH reaction using 0.04% bromthymol blue (or equivalent pH indicator) and the color reaction recorded?	4.5.4	Y
5. ANALYTICAL METHODOLOGY		
General	**5.1**	
For compliance samples, does the laboratory use only the analytical methodologies specified in the Total Coliform Rule (TCR), the Surface Water Treatment Rule (SWTR), and the Groundwater Rule (GWR)?	5.1.5	Y
Is the laboratory certified for all analytical methods it uses for compliance purposes?	5.1.2	Y
At a minimum, is the laboratory certified for one total coliform method and one fecal coliform or E. coli method?		Y
Is the laboratory certified for a second total coliform method if one method cannot be used for some drinking waters?		Y
For a laboratory that enumerates heterotrophic bacteria for compliance with the SWTR, is the laboratory certified for either the Pour Plate Method or the SimPlate method for heterotrophic bacteria?		Y
Are water samples shaken vigorously at least 25 times before analyzing?	5.1.3	y
QC If dilution buffer is used, does the laboratory check the buffer volume in one dilution bottle of each batch or lot?	5.1.4	Y
QC For a 90-mL or 99-mL volume, is the tolerance ±2 mL?		Y
Does the laboratory analyze a 100-mL sample volume for total coliforms in drinking water?	5.1.5	Y
Media (or defined substrate)	5.1.6	
Are dehydrated media stored in a cool dry location and discarded by the manufacturer's expiration date?	5.1.6.1	Y
Is caked or discolored dehydrated media discarded?		Y
QC For media prepared in the laboratory is the following information recorded?	5.1.6.2	
- Date of preparation		Y
- Type of medium		Y
- Lot number		Y
- Sterilization time and temperature		Y
- Final pH (after sterilization)		Y
- Technician's initials		Y
QC For media prepared commercially is the following recorded for each lot?	5.1.6.3	
- Date received		Y
- Type of medium		Y
- Lot number		Y
- pH verification		Y
QC Are media prepared commercially discarded by manufacturer's expiration date?		Y
QC Is each new lot of dehydrated or prepared commercial medium and each batch of laboratory-prepared medium checked before use for sterility and with positive and negative culture controls?	5.1.6.4	Y
QC Are these results recorded?		Y
QC For laboratories using commercially prepared media with manufacturer shelf lives of greater than 90 days, are positive and negative controls run each quarter, in addition to that noted above?		Y
QC Are these results recorded?		Y

ELEMENT	ITEM	Y/N/O
QC For control organisms, are stock cultures periodically checked for purity and the results recorded, or are commercially available disks impregnated with the organism used?		Y
If prepared medium is stored after sterilization, is it maintained in the dark as follows?	5.1.6.5	
- poured plates 1° - 5°C 2 weeks		Y
- broth in containers with loose-fitting closures 1° - 30°C 2 weeks		Y
- broth in tightly closed containers 1° - 30°C 3 months		Y
QC Does the laboratory perform parallel testing between a newly approved test and another EPA-approved procedure for enumerating total coliforms for at least several months and/or several seasons to assess the effectiveness of the new test for the wide variety of water types submitted for analysis? Recommended.	5.1.7	Y
Does the laboratory perform the approved methods listed in this section for the TCR, SWTR, and/or GWR?	5.1.8	Y
Fermentation broth methods	5.2	
General	5.2.1	
Is the water level of the water bath above the upper level of the medium in the culture tubes?	5.2.1.1	Y
If a Dri-bath incubator is used, is the specified temperature requirement maintained in all tube locations used?	5.2.1.2	O
Multiple Tube Fermentation Technique (for detecting total coliforms in drinking water and enumerating total coliforms in source water)	5.2.2	
For drinking water samples, is the total sample volume of 100 mL used for each test?	5.2.2.1	Y
For source water samples, are at least 3 series of five tubes each with appropriate sample dilutions used?	5.2.2.2	O
Media	5.2.2.3	
Is lauryl tryptose broth (LTB) used in the presumptive test and 2% brilliant green lactose bile broth (BGLBB) in the confirmed test?	5.2.2.3.1	Y
If lactose broth (LB) is used in lieu of LTB, has the laboratory conducted at least 25 parallel tests between this medium and LTB using the waters normally tested?		O
Has this comparison demonstrated that the false-positive rate and false-negative rate for total coliforms, using LB, is less than 10%?		O
Is this comparison information documented and the records retained?		O
Is the final pH of LTB medium 6.8 ± 0.2?		Y
Is the final pH of 2% BGLBB 7.2 ± 0.2?		Y
Is the test medium concentration adjusted to compensate for the sample volume so that the resulting medium after sample addition is single strength?	5.2.2.3.2	Y
If a single 100-mL sample volume is used, is the inverted vial replaced with an acid indicator (bromcresol purple)?		Y
Is the medium autoclaved at 121°C for 12-15 minutes?		Y
Is the sterile medium in tubes examined to ensure that the inverted vials, if used, are free of air bubbles and are at least one-half to two-thirds covered after the water sample is added?	5.2.2.3.3	Y
Is the inoculated medium incubated at 35°±0.5°C for 24±2 hours?	5.2.2.4	Y
If no gas or acid detected, is the inoculated medium incubated for another 24 hours for a total incubation time of 48±3 hours?		Y
Is each 24- and 48-hour tube that has growth or is gas-positive or acid-positive confirmed using 2% BGLBB?	5.2.2.5	Y
For drinking water samples, is each total coliform-positive sample tested for the presence of either fecal coliforms or E. coli?	5.2.2.6	Y
Invalidation of total coliform-negative samples	5.2.2.7	
For drinking water samples, are all samples that produce a turbid culture (i.e., heavy growth) in the absence of gas/acid production, in LTB or LB, invalidated?	5.2.2.7.1	Y
Does the laboratory then collect, or request that the system collect, another sample within 24 hours from the same location as the original invalidated sample?		Y
Although not required before invalidation, does the laboratory perform a confirmed test and/or a fecal coliform/E. coli test on the total coliform-negative culture to check for coliform suppression?		Y
And if the confirmed test is total coliform-positive or fecal coliform/E. coli-positive, does the laboratory report the sample as such?		Y
If the follow-up test is total coliform-negative, does the laboratory invalidate the sample?		Y

ELEMENT	ITEM	Y/N/O
For source water samples, are all samples that produce a turbid culture (i.e., heavy growth) in the absence of gas/acid production in LTB or LB invalidated?	5.2.2.7.2	O
Does the laboratory collect, or request that the system collect, another sample from the same location as the original invalidated sample?		O
Although not required before invalidation, does the laboratory perform a confirmed test on the total coliform-negative culture and, if the confirmed test is total coliform-positive, is the MPN reported?		O
If the confirmed test is total coliform-negative, is the sample invalidated?		O
Presence-Absence (P-A) Coliform Test (for detecting total coliforms in drinking water)	5.2.3	
Medium	5.2.3.1	
When six-times formulation strength medium is used, is it filter-sterilized rather than autoclaved?	5.2.3.1.1	O
Is the medium autoclaved for 12 minutes at 121°C?	5.2.3.1.2	O
Is the total time in the autoclave less than 30 minutes?		O
Are the bottles placed in the autoclave with space between them?		O
Is the final pH of the medium 6.8±0.2?		O
If the prepared medium is stored, is it maintained in a culture bottle at 1E-30°C in the dark for no more than 3 months?	5.2.3.1.3	O
Is the stored medium discarded if evaporation exceeds 10% of original volume?		O
Is a 100-mL sample inoculated into a P-A culture bottle?	5.2.3.2	O
Is the sample/medium incubated at 35°±0.5°C and observed for yellow color (acid) after 24 and 48 hours?	5.2.3.3	O
Are yellow cultures confirmed in BGLBB and a fecal coliform/E. coli test conducted?	5.2.3.4	O
Are all samples which produce a non-yellow turbid culture in P-A medium invalidated?	5.2.3.5	O
Does the laboratory collect, or request that the system collect, another sample from the same location as the original invalidated sample?		O
Although not required before invalidation, does the laboratory perform a confirmed test on the total coliform-negative culture and/or a fecal coliform/E. coli test and, if the confirmed test is total coliform-positive, is the sample reported as such?		O
If the confirmed test is total coliform-negative, is the sample invalidated?		O
Fecal Coliform Test (using EC Medium for fecal coliforms in drinking or source water, or A-1 Medium for fecal coliforms in source water only)	5.2.4	Y
EC Medium	5.2.4.1	
Is EC medium used to test a total coliform-positive culture for fecal coliforms under the Total Coliform Rule?	5.2.4.1.1	Y
Is each total coliform-positive culture transferred from a presumptive tube/bottle, or each presumptive total coliform-positive colony (unless a cotton swab is used), to at least one tube containing EC Medium with an inverted vial?		Y
Is EC medium used to enumerate fecal coliforms in source water, in accordance with the SWTR?	5.2.4.1.2	O
When conducting a MTF test, are three sample volumes of source water with five or ten tubes/sample volume used?		O
Is a culture from each total coliform-positive tube transferred to a tube containing EC Medium with an inverted vial?		O
Is EC Medium autoclaved at 121°C for 12-15 minutes?	5.2.4.1.3	Y
Is the final pH of EC medium 6.9±0.2?		Y
Are the inverted vials examined to ensure that they are free of air bubbles and at least one-half to two-thirds covered after the sample is added?	5.2.4.1.4	Y
Is EC Medium incubated at 44.5°±0.2°C for 24±2 hours?	5.2.4.1.5	Y
Is any amount of gas detected in the inverted vial of a tube that has turbid growth considered a fecal coliform-positive test, regardless of the result of any subsequent test on that culture?	5.2.4.1.6	Y
A-1 Medium	5.2.4.2	
If A-1 Medium is used, is it used to enumerate only fecal coliforms in source water, in accordance with SWTR, and not for drinking water samples?	5.2.4.2.1	O
Are three sample volumes of source water used in a five- or ten-tube/sample volume format?		O
Is A-1 Medium autoclaved at 121°C for 10 minutes?	5.2.4.2.2	O
For A-1 Medium, is the final pH 6.9±0.1?		O
Are inverted tubes examined to ensure that they are free of air bubbles?	5.2.4.2.3	O
Is A-1 Medium incubated at 35°±0.5°C for three hours, and then incubated at 44.5°±0.2 °C for 21±2 hours?	5.2.4.2.4	O

ELEMENT	ITEM	Y/N/O
Are loose-cap tubes stored in the dark at room temperature for no longer than two weeks, or in tightly closed screw-cap tubes in the dark at <30°C for no longer than three months?	5.2.4.2.5	O
Is any amount of gas detected in the inverted vial of a tube with turbid growth considered a fecal coliform-positive test?	5.2.4.3	O
Azide dextrose medium (for detecting fecal streptococci in ground water)	5.2.5	O
For testing 100-mL samples, is triple strength (3X) formulation in a culture bottle prepared and then autoclaved at 121°C for 15 minutes?	5.2.5.1	O
Is medium final pH 7.2±0.2?		O
Is a 100-mL water sample added to the sterilized medium and incubated at 35°±0.5°C?	5.2.5.2	O
Is the culture checked for turbidity after 24±2 hours?	5.2.5.3	O
If turbidity is not observed, is the culture reincubated and checked again after a total incubation period of 48±3 hours?		O
Are turbid cultures confirmed as fecal streptococci by streaking a portion of the broth onto bile esculin agar (BEA) or bile esculin azide agar (BEAA)?	5.2.5.4	O
Are BEA and BEAA autoclaved at 121°C for 15 minutes?	5.2.5.5	O
Is the final pH 6.6±0.2 for BEA and 7.1±0.2 for BEAA?		O
After streaking, are plates incubated at 35°±0.5°C for 48 hours?	5.2.5.6	O
Are the brownish-black colonies with brown halos on BEA or BEAA used as confirming the presence of fecal streptococci?	5.2.5.7	O
If required, does the laboratory perform an enterococci test by transferring one or more fecal streptococci colonies to brain heart infusion broth supplemented with 6.5% NaCl and incubating the culture at 35°±0.5C for 48 hrs?		O
Enzyme (chromogenic/fluorogenic) substrate tests	**5.3**	
General	5.3.1	
For detecting total coliforms and E. coli in drinking water by an enzyme substrate test, does the laboratory use one of the following: MMO-MUG test (Colilert), Colisure test, E*Colite test, Readycult Coliforms 100 Presence/Absence Test, Fluorocult LMX test, or Colitag test?	5.3.1.1	Y
For enumerating total coliforms in source waters by an enzyme substrate test, does the laboratory use the Colilert test?		Y
If a laboratory uses a fermentation method to detect total coliforms in drinking water, and the sample is total coliform-positive, does the laboratory transfer the positive culture to the EC+MUG test to detect E. coli, but not to any other enzyme substrate test medium in Section 5.3?		O
Media	5.3.1.2	
Does the laboratory purchase media from a commercially available source only, and not prepare media from basic ingredients?	5.3.1.2.1	Y
Are media kept protected from light?	5.3.1.2.2	Y
Is each lot of medium checked for fluorescence before use with a 365-366-nm ultraviolet light with a six watt bulb?	5.3.1.2.3	Y
If medium exhibits faint fluorescence, is another lot used that does not fluoresce?		Y
If samples plus medium exhibit color changes before incubation, is the medium discarded and another lot of medium used?	5.3.1.2.4	Y
Are glass and plastic bottles and test tubes checked before use with a 365-366-nm ultraviolet light source with a 6-watt bulb to ensure that they do not fluoresce?	5.3.1.3	Y
If they fluoresce, does the laboratory use another lot of containers that does not fluoresce?		Y
If a Whirl-Pak7 bag is used to incubate the Colilert or Colitag medium or any other medium which changes to a yellow color to indicate a positive result, is a type used that has a barrier (e.g., B01417) to prevent gaseous emissions to other Whirl-Pak7 bags during incubation?	5.3.1.4	O
QC If a small air-type incubator is used, are samples brought to room temperature before incubation?	5.3.1.5	O
If a water bath is used, is the water level above the upper level of the medium?	5.3.1.6	Y
For E. coli testing, are all total coliform-positive samples placed under a UV lamp (365-366 nm) in a darkened area?	5.3.1.7	Y
Does the laboratory refrain from using the enzyme substrate test to confirm a presumptive total coliform-positive culture in a fermentation broth or on a membrane filter?	5.3.1.8	O
Does the laboratory invalidate any sample that produces an atypical color change (in the absence of a yellow color) and then collect, or request that the system collect, another sample from the same location as the original invalidated sample?	5.3.1.9	Y
Does the laboratory use another method to test the second sample?		Y

ELEMENT	ITEM	Y/N/O
Is the reference comparator provided by the manufacturer discarded by the manufacturer's expiration date?	5.3.1.10	Y
Criteria for specific media	5.3.2	
For the Colilert test, are samples incubated at 35°±0.5°C for 24 hours?	5.3.2.1	Y
Is a sample with a yellow color in the medium equal to or greater than reference comparator recorded as total coliform-positive?		Y
Is a sample with a yellow color lighter than comparator incubated for another four hours but no longer than 28 hours total?		Y
Is a sample with a yellow color lighter than the comparator after 28 hours of incubation recorded as total coliform-negative?		Y
Are coliform-positive samples that fluoresce under a UV light marked as E. coli-positive?		Y
For the Colilert-18 test, are samples incubated for 18 hours (up to 22 hours if the sample after 18 hours is yellow, but lighter than the comparator)?		Y
For enumerating total coliforms in source waters, does the laboratory use the Colilert test, a 5- or 10-tube configuration, Quanti-Tray, or Quanti-Tray 2000 for each sample dilution tested?	5.3.2.1.1	Y
When dilution water is used, is it either sterile deionized or sterile distilled water, not buffered water?		Y
QC If the Quanti-Tray or Quanti-Tray 2000 test is used, is the sealer checked monthly by adding a dye to the water?	5.3.2.1.2	Y
For the Colisure test, are samples incubated at 35°±0.5°C for 24-48 hours?	5.3.2.2	O
If the medium changes from a yellow color to a red/magenta color, is the sample noted as total coliform-positive?		O
Is a coliform-positive sample that fluoresces under a UV light marked as E. coli-positive?		O
For the E*Colite test, is the sample incubated at 35°±0.5°C for 28 hours?	5.3.2.3	O
If the medium changes from a yellow color to a blue or blue-green color, or a blue color in the corners of the bag, is the sample marked as total coliform-positive?		O
If the medium fluoresces under a UV light, is the sample considered as E. coli-positive?		O
If fluorescence is not observed, is the sample reincubated for an additional 20 hours (for a total incubation time of 48 hours) and checked again for fluorescence?		O
If the medium becomes red in color, is the sample discarded and another sample requested?		O
For the Readycult Coliforms 100 Presence-Absence test, are the contents of a snap pack added to a 100-mL sample and then incubated at 35°±0.5°C for 24±1 hours?	5.3.2.4	O
If the medium changes color from a slightly yellow color to blue-green, is the sample marked as coliform-positive?		O
If the medium fluoresces a bright light-blue color when subjected to long wave UV (365-366 nm) light, is the sample marked as E. coli-positive?		O
For the Fluorocult LMX test, is the medium added to purified water, mixed, and the mixture then boiled to dissolve the medium completely in the water?	5.3.2.5	O
Are 100-mL aliquots transferred to 250-mL bottles and then autoclaved for 15 minutes?		O
Are the autoclaved bottles cooled before adding the 100-mL water sample?		O
Is the E. coli/Coliform Supplement not added to the medium?		O
Is the sample then incubated at 35°±0.5°C for 24±1 hours?		O
If the medium changes color from a slightly yellow color to blue-green, is the sample marked as coliform-positive?		O
If the medium fluoresces a bright light-blue color when subjected to long wave UV (365-366 nm) light, is the sample marked as E. coli-positive?		O
For the Colitag test, are samples incubated at 35°±0.5°C for 24±2 hours?	5.3.2.6	O
If the medium changes to a yellow color, is the sample marked as coliform-positive?		O
If the medium fluoresces under a UV light, is the sample marked as E. coli-positive?		O
EC Medium + MUG (for detection of E. coli)	5.3.3	
If EC medium + MUG is used, is a total coliform-positive culture transferred from a presumptive tube/bottle or colony to this medium?	5.3.3.1	O
Is the final pH of EC medium + MUG 6.9±0.2?	5.3.3.2	O
Is the medium plus sample incubated at 44.5°±0.2°C for 24±2 hours and then tested for fluorescence?	5.3.3.4	O
Enterolert test (for detection of enterococci in ground water)	5.3.4	O
Is the medium stored in the dark at 4°-30°C until used?	5.3.4.1	O

ELEMENT	ITEM	Y/N/O
Is Enterolert reagent added to a 100-mL sample and the sample/medium incubated at 41°±0.5°C for 24-28 hours?	5.3.4.2	O
Is fluorescence under a UV lamp used to indicate the presence of enterococci?		O
Membrane Filter (MF) methods	**5.4**	
General	5.4.1	
For source water samples (SWTR), do dilutions yield 20 to 80 total coliform colonies or 20 to 60 fecal coliforms for at least one dilution or volume?	5.4.1.1	Y
QC Is at least one membrane filter and filtration unit sterility check conducted at the beginning and the end of each filtration series by filtering 20-30 mL of dilution water through the membrane filter and testing for growth?	5.4.1.2	Y
QC If the control indicates contamination, does the laboratory reject all data from affected samples and request an immediate resampling?		Y
QC Does the laboratory consider a filtration series as ended when 30 minutes or more has elapsed between sample filtrations?		Y
Are filtration funnels rinsed after each sample filtration with two or three 20-30 mL portions of sterile rinse water to ensure that the entire sample is rinsed off the funnel onto the filter?	5.4.1.3	Y
Are absorbent pads saturated with at least 2 mL of broth and the excess medium removed by Adecanting@ the plate?	5.4.1.4	O
MF method for detecting total coliforms and E. coli in drinking water, enumerating total coliforms or fecal coliforms in source water, and detecting E. coli in ground water	5.4.2	Y
Media for total coliforms, fecal coliforms, and E. coli	5.4.2.1	Y
If either M-Endo agar or broth or M-Endo agar LES is used to detect total coliforms in drinking water or enumerating total coliforms in source water, is either the single step or the enrichment technique used?	5.4.2.1.1	Y
Is denatured ethanol used in the rehydration procedure?		Y
Is the medium prepared in a sterile flask?		Y
Is a boiling water bath or a constantly attended hot plate with a stir bar used to bring the medium just to the boiling point but not boiled?		Y
Is the final for M-Endo medium pH 7.2±0.1 and the final pH for M-Endo agar LES 7.2±0.2?		Y
Is M-Endo medium or M-Endo agar LES incubated at 35E±0.5EC for 22-24 hrs?	5.4.2.2	Y
Are colonies with a metallic (golden) sheen recorded as presumptive total coliforms?	5.4.2.2	Y
If m-ColiBlue24 medium is used to detect total coliforms and E. coli in drinking water, are the ampules of broth inverted 2-3 times to mix contents before breaking and the contents then poured evenly over an absorbent pad?	5.4.2.1.2	O
Are unopened refrigerated ampules stored in the dark?		O
Are unopened ampules discarded before the expiration date, or earlier if contamination is observed?		O
Is the medium final pH 7.0±0.2?		O
Is m-ColiBlue24 incubated at 35E±0.5EC for 24 hrs?	5.4.2.1.3	O
Are red colonies recorded as total coliforms, and blue to purple colonies recorded as E. coli?		O
If MI medium (with or without agar) is used to detect total coliforms and E. coli in drinking water or enumerate total coliforms in source water, is commercially prepared presterilized bottled MI agar or broth not autoclaved?		O
Is this presterilaized bottled agar medium melted in a boiling water bath (or by other processes recommended by the manufacturer), and care taken not to overheat the agar?		O
Is the medium then cooled slightly and poured immediately into sterile plates?		O
If dehydrated culture medium is used, is it prepared and autoclaved according to manufacturer's instructions?		O
Is this agar medium cooled before adding freshly prepared, filter- sterilized cefsulodin, and then poured immediately into sterile plates?		O
Is the final pH of MI agar 6.95±0.20 and the final pH of MI broth 7.05±0.20?		O
Is MI medium incubated at 35E±0.5EC for 24±2 hrs?	5.4.2.2	O
Are fluorescent colonies under UV light recorded as total coliforms, and blue colonies under normal light recorded as E. coli?	5.4.2.2	O
If Chromocult7 Coliform Agar is used to detect total coliforms and E. coli in drinking water, is the agar medium autoclaved or overheated?	5.4.2.1.4	O
Is the final pH of this medium 6.8±0.2?		O
If a heavy background of heterotrophic bacteria is expected, is cefsulodin solution added to 1L of cooled (45°-50°C) medium as a solution of 10 mg cefsulodin dissolved in 2-mL deionized or distilled water?		O
Is Chromocult incubated at 36E±1EC for 24±1 hrs?	5.4.2.2	O

ELEMENT	ITEM	Y/N/O
Are salmon to red colonies recorded as total coliforms, and dark-blue to violet colonies recorded as E. coli?	5.4.2.2	O
If Coliscan7 is used to detect total coliforms and E. coli in drinking water or enumerate total coliforms in source water, is the manufacturer's protocol for reconstitution and antibiotic addition followed?	5.4.2.1.5	O
Is the antibiotic, cefsulodin, overheated?		O
Is the final pH of Coliscan agar 7.00±0.20?		O
Is Coliscan incubated at 32E-37EC for 24-28 hrs?	5.4.2.2	O
Are pink-magenta colonies recorded as total coliforms, and purple-blue colonies recorded as E. coli?	5.4.2.2	O
If m-FC broth, with or without agar, is used to enumerate fecal coliforms in source water, is the medium autoclaved?	5.4.2.1.6	O
Is m-FC broth just brought to the boiling point?		O
Is the final pH of m-FC medium 7.4±0.2?		O
Is m-FC broth incubated at 44.5E±0.2EC for 24±2 hrs?	5.4.2.2	O
Are blue colonies recorded as fecal coliforms?	5.4.2.2	O
Is the prepared medium refrigerated when stored and brought to room temperature before use?	5.4.2.1.7	O
Are petri dishes containing medium stored in a plastic bag or tightly closed container, and used within 2 weeks?		Y
Are plates with laboratory-prepared broth medium discarded after 96 hours, poured agar plates after 2 weeks, and ampuled broth discarded before the manufacturer's expiration date?		Y
Are the date and time of medium preparation recorded?		Y
For invalidation of a total coliform-negative drinking water sample, are all samples resulting in confluent growth or TNTC growth invalidated unless at least one total coliform colony is detected?	5.4.2.3	Y
If no coliforms are detected, is the sample recorded as Aconfluent growth@ or ATNTC@ and an additional sample requested from the same sampling site?		Y
Does the laboratory perform a verification test on the total coliform-negative culture before invalidation?		Y
If the verification test is total coliform-positive, does the laboratory report the sample as total coliform-positive?		Y
If the verification test is total coliform-negative, is the sample invalidated?		Y
For invalidation of source water samples (SWTR), where coliform density must be determined, does the laboratory invalidate any sample that results in confluent growth or TNTC, even when total coliform or fecal coliform colonies are present?	5.4.2.4	Y
For drinking water samples on M-Endo type media, are all sheen colonies, up to a maximum of five, verified by using either LB or LTB and then 2% BGLBB or, alternatively, by using a cytochrome oxidase and ß-galactosidase procedure?	5.4.2.5	Y
If no sheen colonies are observed, are up to five red questionable sheen colonies and/or red non-sheen colonies representing different morphological types verified?		Y
For drinking water samples, are total coliform-positive colonies tested for E. coli or fecal coliforms?	5.4.2.6	Y
When EC Medium or EC + MUG is used, are colonies transferred by employing one of the options specified by the Total Coliform Rule?		Y
When the swab technique is used, is a single swab used to inoculate a presumptive total coliform-positive sample into EC or EC+MUG first, LTB second, and BGLBB third?		Y
For source water samples, are the initial total coliform counts adjusted based upon verified data?	5.4.2.7	Y
QC For source water samples when two or more analysts are available, does each analyst count the total coliform or fecal coliform colonies on the same membrane monthly and do the counts agree within 10%?	5.4.2.8	Y
Nutrient Agar ± MUG Test (for detection of E. coli in drinking water or ground water)	5.4.3	
Is the medium autoclaved at 121°C for 15 minutes?	5.4.3.1	O
Is the final MUG concentration 100 µg/L?		O
Is the final pH of NA + MUG 6.8±0.2?		O
QC Are positive and negative culture controls tested as stated in 5.1.6.4?	5.4.3.2	O
QC Are culture controls filtered or spot-inoculated onto a membrane filter on M-Endo broth or agar, or M-Endo agar LES, and incubated at 35°±0.5°C for 24 hours?		O
QC Is the filter then transferred to NA + MUG and incubated at 35°±0.5°C for another four hours?		O
QC Are these results read and recorded?		O

ELEMENT	ITEM	Y/N/O
Is the membrane filter containing total coliform colonies transferred to the surface of the Nutrient Agar + MUG medium?	5.4.3.3	O
Is the presence of each sheen colony marked on the petri dish lid with permanent marker, and the lid and base marked to realign the lid when removed?		O
For the total coliform verification test, is a portion of each colony transferred with needle before the MF transfer or after the four-hour NA + MUG incubation time?		O
Alternatively, is the membrane filter surface swabbed with a sterile cotton swab after the four-hour incubation time on NA + MUG and then transferred to a total coliform verification test?		O
Is the inoculated NA + MUG medium incubated at 35°±0.5°C for four hours?	5.4.3.4	O
Is fluorescence checked by using a UV lamp (365-366 nm) with a six-watt bulb in a darkened room and any fluorescence in the halo around a sheen colony considered positive for E. coli?	5.4.3.5	O
MF method for detecting enterococci/fecal streptococci in ground water	5.4.4	O
Media	5.4.4.1	
When mE agar is used for the detection of enterococci, is basal mE agar prepared, autoclaved, and cooled before the addition of nalidixic acid (or its sodium salt) and triphenyl tetrazolium chloride, both of which are added separately to the medium and mixed?	5.4.4.1.1	O
Is the final pH of mE agar 7.1±0.2?		O
When m-Enterococcus agar is used for the detection of fecal streptococci (not enterococci), is the medium heated, not autoclaved, to dissolve the ingredients?	5.4.4.1.2	O
Is the final pH of m-Enterococcus agar 7.2±0.2?		O
When mEI agar is used for the detection of enterococci, is 0.75g indoxyl-β-D-glucoside added to 1L basal mE agar and then prepared according to 5.4.4.1.1 except that only 0.02 g/L triphenyl tetrazolium chloride is added?	5.4.4.1.3	O
Is the final pH of mEI agar 7.1±0.2?		O
Is a 100-mL sample filtered and the membrane placed on one of the agar media previously listed?	5.4.4.2	O
If m-Enterococcus agar is used, are the plates incubated in an inverted position at 35°±0.5°C for 48 hours?	5.4.4.3	O
Using magnification and a fluorescent lamp, are all light and dark red colonies counted as fecal streptococci?		O
If mE agar is used, are the plates incubated in an inverted position for 48 hours at 41°±0.5°C?	5.4.4.4	O
Is the membrane filter then transferred to EIA medium and incubated at 41°±0.5°C for 20-30 minutes?		O
Using magnification and a fluorescent lamp, are all pink to red colonies on mE agar with a black or reddish brown precipitate on the underside of the filter on EIA agar counted as enterococci?		O
If mEI agar is used, are plates incubated in an inverted position for 24 hours at 41°±0.5°C?	5.4.4.5	O
Using magnification and a fluorescent lamp, is the plate examined, top and bottom, for colonies with a blue halo, and any colony with a blue halo (regardless of colony color) considered as positive for enterococci?		O
Heterotrophic Plate Count (for enumerating heterotrophic bacteria in drinking water)	5.5	
Does the laboratory use the Pour Plate Method or the SimPlate Method for enumerating heterotrophic bacteria in drinking water and for testing reagent grade water?	5.5.1	Y
For systems granted a variance from the TCR's maximum contaminant level, does the laboratory use R2A medium with a method in Standard Methods, Section 9215 for enumerating heterotrophic bacteria in drinking water?		O
Media	5.5.2	
Is the final pH recorded for plate count agar pH 7.0±0.2, R2A agar 7.2±0.2, and SimPlate 7.2±0.2?		Y
For the Pour Plate Method, is melted agar tempered at 44°-46°C in a water bath and maintained no more than 3 hours before pouring?	5.5.3	Y
Is this sterile medium melted only once?		Y
For the Spread Plate Method, is 15 mL of R2A medium (or other medium) poured into a sterile petri dish and allowed to solidify?	5.5.4	O
Is refrigerated medium in bottles or screw-capped tubes stored for no longer than six months, or in petri dishes for no longer than 2 weeks (one week for prepared petri dishes with R2A medium)?	5.5.5	Y
For countable plates of most potable water samples, are 1.0 mL and/or 0.1 mL volumes of the undiluted sample plated?	5.5.6	Y
Are at least duplicate plates prepared per dilution tested?		Y

ELEMENT	ITEM	Y/N/O
For the Pour Plate Method, is the sample pipetted aseptically onto the bottom of a sterile petri dish and then at least 10-12 mL tempered melted agar added?	5.5.7	Y
Is the sample and melted agar mixed, avoiding spillage?		Y
After the agar plates have solidified on a level surface, are they inverted and incubated at 35°±0.5°C for 48±3 hours?		Y
Are plates stacked no more than four high and arranged in the incubator to allow proper air circulation and to maintain a uniform incubation temperature?		Y
Does the laboratory ensure that incubator does not have excess humidity and that the plates do not lose more than 15% by weight during the 48 hours of incubation?		Y
For the Spread Plate Method, is 0.1 or 0.5 mL of the sample (or dilution) pipetted onto the surface of the predried agar in the plate and then spread over the entire surface using a sterile bent glass rod?	5.5.8	O
Is the inoculum absorbed completely before incubating?		O
Are the plates incubated in an inverted position at 20°-28°C for 5-7 days?		O
For the Membrane Filter Technique, does the filtered volume yield between 20-200 colonies?	5.5.9	O
Is the filter transferred to a petri dish containing 5 mL solidified R2A medium and then incubated at 20°-28°C for 5-7 days?		O
Are plates with loose-fitting lids placed in a plastic box with a close-fitting lid and moistened paper towels, and rewetted as necessary?		O
Are colonies counted using a stereoscopic microscope at 10-15X magnification?		O
SimPlate Method	5.5.10	
For a single sample Unit Dose, is a 10-mL test sample added to a test tube containing dehydrated SimPlate medium and then poured onto the center of a plate containing 84 small wells?	5.5.10.1	O
Alternatively, is 9-mL of sterile diluent added to the test tube containing the dehydrated medium, followed by a 1-mL sample, and the medium plus sample then poured onto the center of a plate containing 84 small wells?		O
Is this mixture distributed evenly to the 84 wells and is the excess liquid drained into the absorbent pad on the plate?		O
Is the plate inverted and incubated at 35°±0.5°C for 45-72 hours?		O
Is bacterial density determined by counting the number of wells that fluoresce under a 365-366-nm UV light, and converting this value to a Most Probable Number/mL using the manufacturer's Unit Dose MPN table?		O
If a 10-mL sample is used, is the Unit Dose MPN/mL read directly or, if a 1-mL sample is used, is the MPN/mL value corrected by multiplying it by 10?		O
For the Multiple Dose for 10 samples of 1 mL each, is a 100-mL sterile diluent added to the dehydrated SimPlate medium and shaken to dissolve?	5.5.10.2	O
Is a 1.0-mL test sample then pipetted to the center of a plate, followed by 9 mL of the reconstituted medium?		O
Is the plate then gently swirled to mix and distribute the sample and medium mixture evenly to the 84 wells, with the excess liquid then being drained into the absorbent pad on the plate?		O
Is the plate inverted and incubated at 35°±0.5°C for 45-72 hours?		O
Is bacterial density determined by counting the number of wells that fluoresce under a 365-366-nm UV light, and converting this value to a Most Probable Number/mL using the manufacturer's Multi-Dose MPN table?		O
If sample dilutions were made during sample preparation, is the MPN/mL value multiplied by the dilution factor?		O
For the Pour Plate and Spread Plate Techniques, are colonies counted manually using a dark field colony counter?	5.5.11	Y
Are only plates having 30 to 300 colonies counted, except for plates inoculated with 1.0 mL of undiluted sample where counts of less than 30 are acceptable?		Y
QC Is each batch or flask of agar checked for sterility by pouring a final control plate?	5.5.12	Y
QC Does the laboratory reject data if the control is contaminated?		Y
6. SAMPLE COLLECTION, HANDLING, AND PRESERVATION		
Sample Collector	**6.1**	
Is the sample collector trained in aseptic sampling procedures and, if required, approved by the appropriate regulatory authority or its designated representative?		Y
Sampling	**6.2**	
Are the drinking water samples collected under the Total Coliform Rule representative of the water distribution system?	6.2.1	Y
Are the water taps used for sampling free of aerators, strainers, hose attachments, mixing type faucets, and purification devices?		Y
Are only cold water taps used?		Y

ELEMENT	ITEM	Y/N/O
Are service lines cleared before sampling by maintaining a steady water flow for at least 2 minutes or until a steady water temperature is reached?		Y
Is at least a 100-mL sample volume collected, allowing at least a 1-inch air space in the container to facilitate mixing of the sample by shaking?		Y
Is a sample information form completed immediately after sample collection?		Y
If a sample bottle is filled too full to allow for proper mixing, is the entire sample poured into a larger sterile container and mixed before proceeding with the analysis?		Y
For the SWTR, are the source water samples representative of the source of supply and collected not too far from the intake point, but at a reasonable distance from the bank or shore?	6.2.2	Y
Is the sample volume sufficient to perform all the tests required?		Y
For the analysis of coliphage, E. coli, or enterococci under the GWR, is at least a 100-mL sample volume collected?	6.2.3 6.2.4	Y
Sample Icing	**6.3**	
For drinking water bacterial samples, is the sampler encouraged to hold samples at <10°C during transit to the laboratory?	6.3.1	O
For source water bacterial samples, are samples held at <10°C during transit to the laboratory?		O
Does the laboratory reject samples that have been frozen?		O
For coliphage analysis under the GWR, are samples shipped at <10°C, stored at 1°-5°C, and not frozen?	6.3.2	O
QC For SWTR samples and coliphage samples, does the laboratory record sample temperature upon receipt?		O
QC Does the laboratory flag samples that have a temperature upon receipt of >10°C, whether iced or not, unless the time since the sample collection is less than two hours?		O
Sample Holding/Travel Time	**6.4**	
For the analysis of total coliforms in drinking water, does the time between sample collection and placement of the sample in the incubator not exceed 30 hours?	6.4.1	Y
Are all samples analyzed on the day of receipt?		Y
Are samples received late in the day refrigerated overnight only if analysis can begin within 30 hours of collection?		Y
For total coliforms and fecal coliforms in surface water sources, and for heterotrophic bacteria in drinking water, is the time from sample collection to placement in the incubator less than eight hours?	6.4.2	Y
For coliphage analysis, is the time from sample collection to placement of sample in the incubator less than 48 hours?	6.4.3	O
For coliphage analysis, is the time from sewage sample collection to analysis of QC spiking suspension less than 24 hours, unless re-titered and the titer has not decreased by more than 50%?		O
If the titer has not decreased by more than 50%, is the sample stored no longer than 72 hours?		O
For E. coli and enterococci analysis under the GWR, is the time between sample collection and the placement of sample in the incubator less than 30 hours?	6.4.4	Y
Sample Information Form	**6.5**	
After collection, does the sampler enter the following information, in indelible ink, on sample information form?		
- Name of system (PWSS identification number if available)		Y
- Sample identification (if any)		Y
- Sample site location		Y
- Sample type (e.g., a routine distribution, repeat, raw or process, or other special purpose)		Y
- Date and time of collection		Y
- Analysis requested		Y
- Disinfectant residual		Y
- Name of sampler		Y
Any remarks		
Chain-of-Custody	**6.6**	
Are applicable State regulations pertaining to chain-of-custody followed by sample collectors and the laboratory?		Y
7. QUALITY ASSURANCE		
Does the laboratory have a written QA Plan prepared and available for Inspection?	**7.1**	Y
Does the laboratory follow the written QA Plan?		Y

ELEMENT	ITEM	Y/N/O
Does the laboratory have a Standard Operating Procedure available for review pertaining to its own calibration of equipment or supplies?		Y
Does the laboratory successfully analyze at least one set of PT samples once every 12 months for each method for which it is certified?	7.2	Y
For methods used to test the presence or absence of an organism in a sample, does the laboratory analyze each PT sample set using a single analytical method only?		Y
8. RECORDS AND DATA REPORTING		
Legal Defensibility	8.1	
Are compliance monitoring data being maintained by the laboratory both thorough and accurate, and thus legally defensible?		Y
Does the laboratory's QA plan and/or SOPs describe the policies and procedures used by the facility for record retention and storage?		Y
If samples are expected to become part of legal action, does the laboratory follow chain-of-custody procedures?		Y
Maintenance of Records	8.2	
Does the public water system maintain records of microbiological analyses for five years?		Y
Does the laboratory maintain easily accessible records for five years or until the next certification data audit is completed, whichever is longer?		Y
Does the laboratory notify the client water system before disposing of records so they may request copies if needed?		Y
Does the laboratory backup all electronic data by protected tape, disk, or hard copy?		Y
When the laboratory changes its computer hardware or software, are provisions in place for transferring old data to the new system so that data remain retrievable within the specified time frames?		Y
Sampling Records	8.3	
Are all data recorded in ink, with any changes lined through such that the original entry is visible?		Y
Are changes initialed and dated?		Y
Does the laboratory have the following sample information readily available?	8.3.1-4	
- Date and time of sample receipt by the laboratory		Y
- Name of the laboratory person receiving the sample		Y
- Information on any deficiency in the condition of the sample		Y
Are samples invalidated for the following reasons?	8.3.4	
- Time between sample collection and receipt by laboratory exceeded		Y
- Presence of disinfectant in sample noticed, e.g., odor		Y
- Evidence of freezing		Y
- Use of a container not approved by the laboratory for the purpose intended		Y
- Insufficient sample volume, e.g., <100 mL		Y
- Presence of interfering contaminants noticed, e.g., hydrocarbons, cleansers, heavy metals, etc.		Y
- Sample temperature exceeding the maximum allowable		Y
Analytical Records	8.4	
Are all recorded data in ink with any changes lined through such that original entry is visible?		Y
Are these changes initialed and dated?		Y
Are the following readily available?	8.4.1-6	
- Laboratory sample identification information		Y
- Information concerning date and time analysis begins		Y
- Name of the laboratory and a signature or initials of the person(s) performing analysis		Y
- Information concerning the analytical technique or method used		Y
- Information concerning all items marked "QC"		Y
- Results of the analyses		Y
Preventive Maintenance	8.5	
Does the laboratory maintain preventive maintenance and repair records for all instruments and equipment?		Y
Are these records kept for five years in a manner that allows for easy inspection?		Y
9. ACTION RESPONSE TO LABORATORY RESULTS		
Testing Total Coliform-Positive Cultures	9.1	
For the Total Coliform Rule, does the laboratory test all total coliform-positive cultures for the presence of either fecal coliforms or E. coli?		Y
Notification of Positive Results	9.2	

ELEMENT	ITEM	Y/N/O
For Total Coliform Rule, does the laboratory promptly notify the proper authority of a positive total coliform, fecal coliform, or E. coli result, so that appropriate follow-up actions can be conducted?	9.2.1	Y
For the Total Coliform Rule, if a sample is fecal coliform- or E. coli-positive, does the system notify the State as soon as it is notified of the test result, i.e., at the end of that day or, if the State office is closed, by the end of the next business day?	9.2.2	Y
Does the laboratory base a total coliform-positive result on the confirmed phase if the Multiple Tube Fermentation Technique or Presence-Absence Coliform Test is used, or the verified test for the Membrane Filtration Technique if M-Endo medium or M-Endo LES agar is used?	9.2.3	Y
If a presumptive total coliform-positive culture does not confirm/verify as such, but is found to be fecal coliform or E. coli-positive, is the sample considered total coliform-positive and fecal coliform/E. coli-positive?		Y
Notification of Total Coliform Interference	**9.3**	
For the Total Coliform Rule, does the laboratory promptly notify the proper authority when results indicate non-coliforms may have interfered with total coliform analysis?		Y

TOTAL ITEMS REVIEWED:	**330**
NUMBER OF ITEMS MEETING THE MINIMUM REQUIREMENTS:	**329**
NUMBER OF ITEMS NOT IN COMPLIANCE WITH MINIMUM REQUIREMENTS:	**1**
LABORAORY SCORE:	**100%**

COMMENTS

COMMENTS

COMMENTS
Bi Monthly

COMMENTS

COMMENTS
45 min @ 132°C

COMMENTS
Do not perform for compliance

COMMENTS

COMMENTS

COMMENTS

COMMENTS

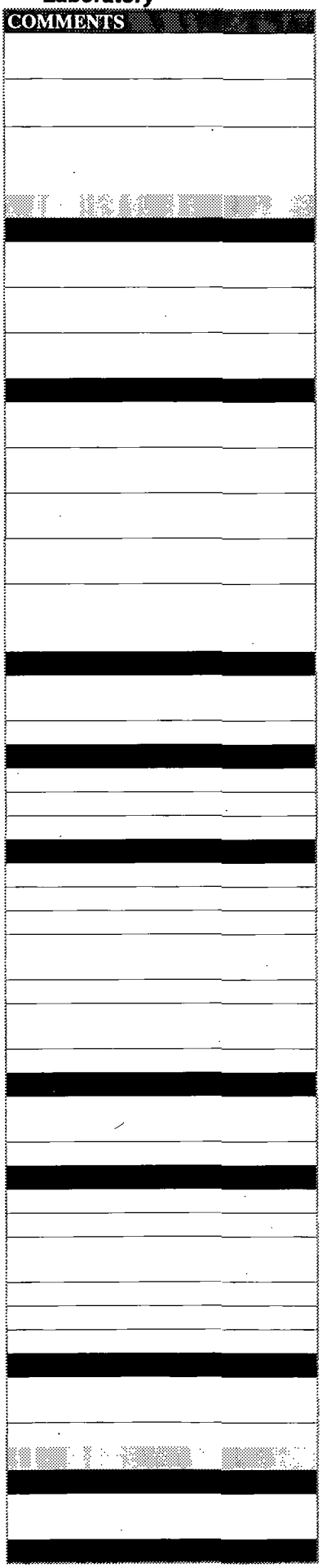
COMMENTS

COMMENTS

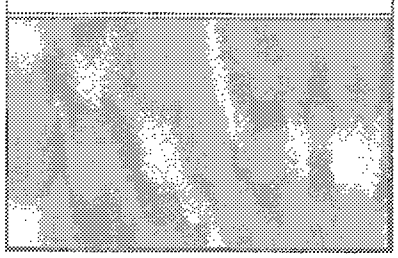
COMMENTS

COMMENTS

COMMENTS



COMMENTS



11.3 Attachment #3: Example On-site Pre-survey Package Template (General Information and Chemistry) rev. 6/20/06

State Laboratory SDWA Pre-Survey Package (Based on 5th ed. of "Lab Cert. Manual")

(Please complete electronically)

Date: August 1, 2006 Completed by (name/title): Thomas L. Ong

Only complete for Methods/Analytes for which the Laboratory seeks SDWA Certification

I. General Information:

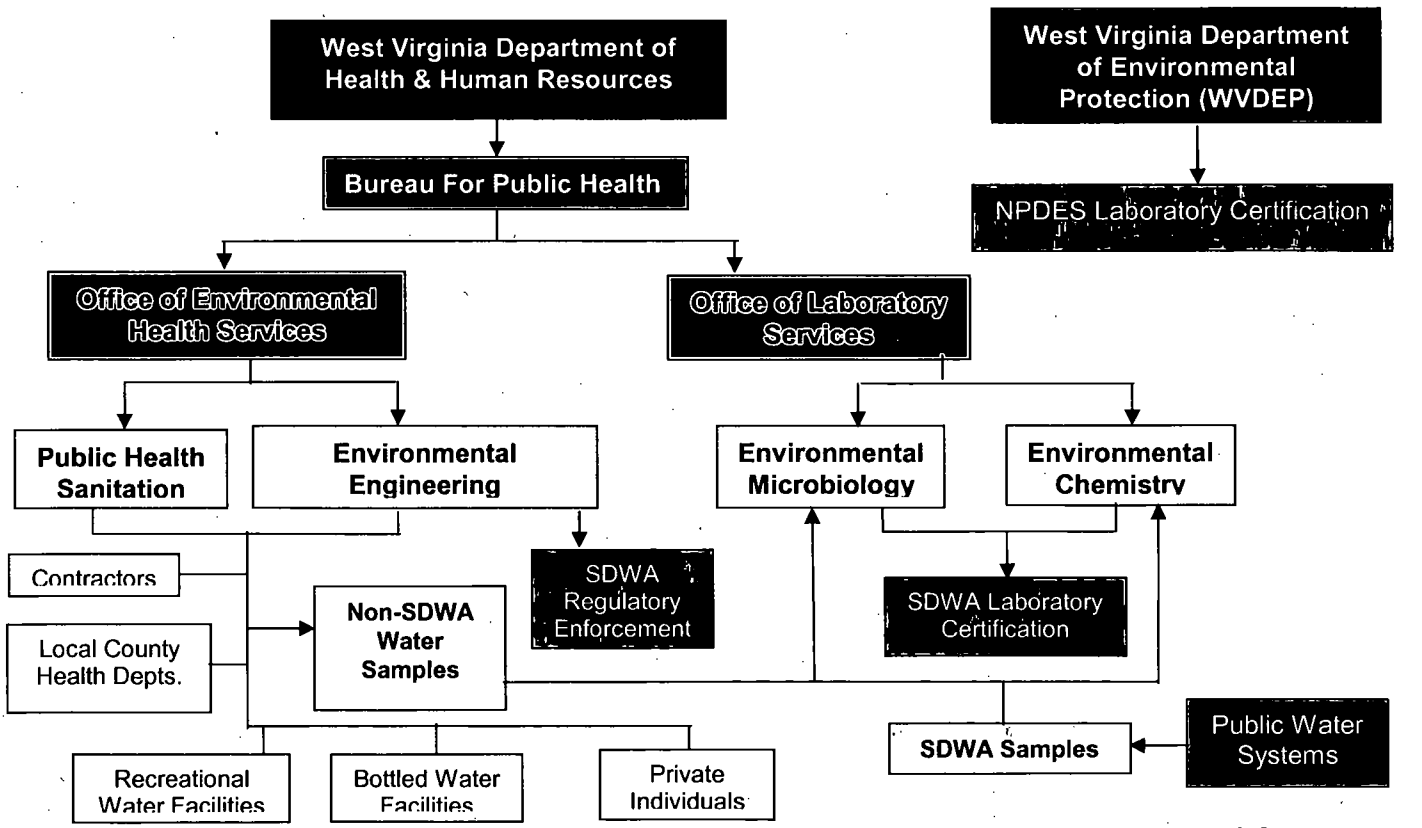
A. Name of Laboratory: **West Virginia Department of Health & Human Resources**
Bureau For Public Health
OFFICE OF LABORATORY SERVICES

B. Address: 167 – 11th Avenue
South Charleston, WV 25303

C. Telephone Number: 304-558-3530

D. Name of Laboratory Director: Andrea Labik, Sc.D.

E. Provide an organizational chart of the laboratory, including any field operations or other internal affiliations to show how the laboratory fits into the general organizational structure.
Indicate SDWA and NPDES related portions of the laboratory organization.



F. List names of principal users of services of the laboratory.

1. Office of Environmental Health Services – Environmental Engineering Division
2. Office of Environmental Health Services – Public Health Sanitation
3. Public Water Systems
4. Bottled Water Facilities
5. Recreational Water Facilities
6. Local County Health Departments
7. Contractors
8. Private Individuals

G. List laboratory support provided by commercial laboratories, and other State or Federal laboratories

None

H. Indicate the approximate number of samples analyzed:

	Microbiology		**Chemical**			
	Approximate Number of Samples/Year	*Approximate % of Laboratory Workload/Yr.	Approximate No. Samples/Year Organic/Inorganic		Approximate % of Lab. Workload/Yr. Organic/Inorganic	
SDWA	8,000	30%				
NPDES	0					
RCRA	0					
Superfund	0					
Other Monitoring	5,500	10%				

* 40% of laboratory work is involved with the Grade A Dairy Testing Program; 20% is involved with Drinking Water & Dairy Lab Certification

Please provide a listing of any codes used for Sample log-in which indicate the associated program:

SEE NEXT PAGE

WATER CODES

(Effective 7-1-2003)

Test Methods

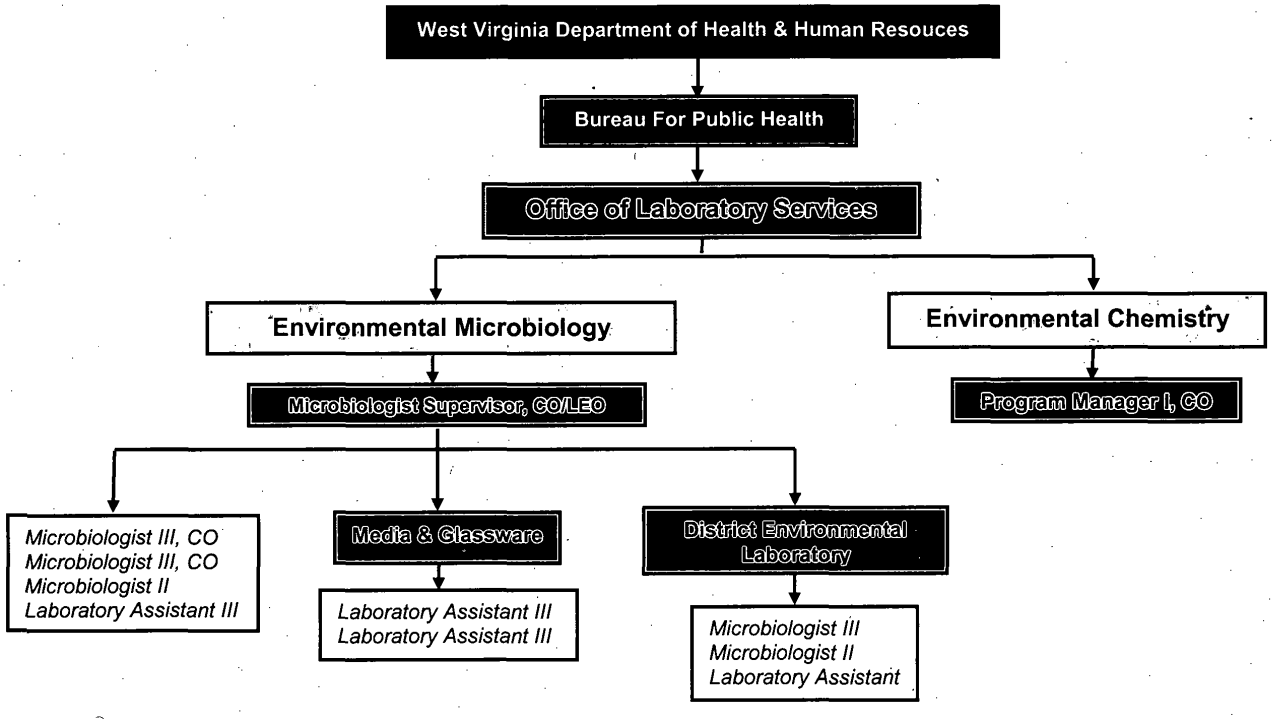
Code	Method	Description/ Sample Volume	Method Reference
1	Membrane Filter Technique	100 mL	SM 9222 B
2	Multiple Tube Fermentation Technique	1 X 100 mL	SM 9221 B
3	Enzyme Substrate Test	Colilert (1 X 100 mL)	SM 9223 B
4	Membrane Filter Technique	Dilutions (< 100 mL)	SM 9222 B
5	Multiple Tube Fermentation Technique	Ten Tube Series (10 X 10 mL)	SM 9221 B/C
6	Multiple Tube Fermentation Technique	Dilutions (3 Tube Series: 10, 1.0, 0.1, etc.)	SM 9221 B/C
7	Enzyme Substrate Test	Colilert (Quanti Tray)	SM 9223 B
8	Enzyme Substrate Test	Colilert (Quanti Tray 2000)	SM 9223 B
9	Heterotrophic Plate Count	Pour Plate Method	SM 9215 B

Sample Types

Code	Sample Type	Other	SDWIS
A	Public Waters		①
B	Privates		
C	Home Loans		
D	Swimming Pools/Hot Tubs		
E	Beaches		
F	Bottled Water/Ice		
G	Dairy Waters	Farms	
H	Dairy Waters	Plants	
I	Raw Waters	Surface and/or Surface-Ground Mix	①
J	Raw Waters	Ground	①
K	Raw Waters	Bottled Waters	
L	Sewage Suspects		
M	Disasters	Public Waters	①
N	Disasters	Private Wells	
O	Proficiency Tests	Multi Tube Fermentation	
P	Proficiency Tests	Enzyme Substrate (Colilert)	
Q	Proficiency Tests	Membrane Filter	

I. Personnel: Provide an organizational Chart which indicates how the Environmental Analyses Sections fit within the organization and how the lab fits in the larger Department/Bureau, etc.

Also , please complete this chart for all technical personnel, including the laboratory director. Use a separate block for each employee and arrange the presentation to reflect the lines of organizational responsibility for Chemistry and Microbiology.



Personnel (Cont.):

Name	Training		Position	Years of Experience		Identify Current Analyses Performed in Support of	
						SDWA	NPDES
	Degree (Check One)	Major		Present Job	Previous Job		
Andrea Labik	✓ Sc.D. MS BS/BA Assoc. HS		Laboratory Director	6 Yrs, 10 Mo.	3 Yrs., 9 Mo.		
Charlotte Billingsley	Ph.D. ✓ MS BS/BA Assoc. HS		Associate Director (Environmental)	13 Years	23 Years		
Thomas L. Ong	Ph.D. MS ✓ BS/BA Assoc. HS	Biology	Microbiologist Supervisor CO/LEO	10 Years	7 Years	SM9221B/E SM9223B SM9222B	
Mike Flesher	Ph.D. ✓ M.P.H. ✓ BS/BA Assoc. HS	Public Health Biology	Microbiologist III CO	6 Years	7 Years	SM9221B/E SM9223B SM9222B	

Personnel (Cont.):

Name	Training		Position	Years of Experience		Identify Current Analyses Performed in Support of	
						SDWA	NPDES
	Degree (Check One)	Major		Present Job	Previous Job		
Tracy Goodson	Ph.D. MS ✓ BS/BA Assoc. HS	Biology	Microbiologist III CO	3 Years	4 Years	SM9221B/E SM9223B SM9222B	
Carole Moore	Ph.D. MS ✓ BS/BA Assoc. HS	Biology	Microbiologist II	3 Years		SM9221B/E SM9223B SM9222B	
Deborah Peters	Ph.D. MS BS/BA Assoc. ✓ HS		Laboratory Assistant III	7 Years		SM9221B/E SM9223B SM9222B	
	Ph.D. MS BS/BA Assoc. HS						

Ex. 5 - Deliberative

Ex. 5 - Deliberative

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Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Robin
Costas/ESC/R3/USEPA/US
10/12/2006 12:13 PM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc Dave Russell/ESC/R3/USEPA/US@EPA, George Long/ESC/R3/USEPA/US@EPA
bcc
Subject WVa report

FYI, I received the information I needed for the Copper flame certification. So, I went into the last report, Joe, and removed all references on problems with copper flame. It should be ready to go as far as my part is concerned.
robin

Method 300.a Checklist

Anions by IC

Analyst: Martha A M.

Instrument: Dionex

4.0 Interferences

4.1 Is the water dip near the fluoride peak eliminated by the addition of 1 mL of 100x eluent concentrate or by using the void volume data event?

4.2 Do you filter samples that contain particles larger than 0.45µ and reagents which contain particles larger than 0.20 µ to prevent damage to the flow system? yes

4.3 Are you aware that is not retained or slightly retained by the column will elute near the fluoride peak and may interfere with the accurate quantitation of the fluoride peak?

6 Equipment and Supplies

6.1 Balance used? AG 245
Calibrated prior to use daily with Class S weights? once a year

6.2 Ion Chromatograph used? DIONEX -120

6.2.1 Guard Column Used AG4A or equivalent? AG-14

6.22 Anion Separator Column used AS4A or equivalent? AS-14

6.23 Suppressor used AMMS, SRS or equivalent? ASRS

6.24 Conductivity detector used? DS-4

6.25 Autosampler or manual injection used? AS-40

6.3 Software used? AI-450, Peak Net 5, Peak Net , strip chart or intergrator? Peak net 5.1

7 Reagents and Standards

7.1 Are samples taken in glass or polyethylene bottles? plastic

7.2 Reagent water used? Resitivity? ~17.8 Conductivity? Water should be free of anions of interest? Water contain particles of less than 0.20 µ? ION PURE 150 continuous

7.3 Does eluent solution contain 1.7mM sodium bicarbonate and 1.8 mM sodium carbonate? How is prepared from solid chemicals or from a purchased eluent concentrate? yes

2.0µ

7.4 Does the regenerant solution for the AMMS contain 0.025N H_2SO_4? _____

7.5 Are the stock standards purchased from ACS certified reagents or purchased commercially? _____

8 Sample Collection, Preservation and Storage

8.2 Are all analytes analyzed within the 28 day holding time with the exception of nitrite, nitrate which must be analyzed within 48 hours? _____

9 Quality Control

9.2.1 Is an Initial Demonstration of Performance run by each analysts for this method? Is this record kept on file by the QAO? _____

9.22 Is the Linear Calibration run initially and verified every six months or whenever a significant change in instrument response is observed or verified? Are a minimum of 3 standards and a blank used? If the calibration verification standard exceeds ± 10 %, is the linearity re-established? For the non-linear part of the curve, are sufficient standards used to define the non-linear portion? _____

9.2.3 Do you run a standard from a second source or LCM initially and quarterly to verify the accuracy of your data? Do you analyze and pass a performance evaluation sample yearly? _____

9.2.4. Is an MDL run by each analyst which is required for this method as well as the Drinking Water Certification Manual? _____

9.3 Assessing Laboratory Performance

9.3.1 Is an LRB run daily to assess contamination problems? yes

9.3.2 Is an LFB run daily with each set of filtered samples? Are recoveries within ± 10% of the true value? yes

9.3.3 Are accuracy and precision and control limits generated and updated after 20-30 points? _____

9.3.4 Are IPC or CLC and a calibration blank run after every 10 samples and at the end of the run? _____

9.4 Assessing Analyte Recovery and Data Quality

9.4.1 Is a laboratory fortified sample matrix or LFM or LSF added to at least 10% of the

samples? _____

9.4.2 Until control limits are established are the limits of 80 to 120 % are used for assess method performance? _____

9.4.8 At least quarterly are replicates of LFB's analyzed to determine the precision of laboratory measurements? _____

10 Calibration and Standarization

10.1 Are at least three calibration standards and a blank prepared for the calibration curve for each analyte? _____

10.2 Are peak height or areas for and the retention time for each analyte tabulated and updated? _____

10.3 Is the calibration curve verified daily and after ever 20 samples? If the response and the retention time vary more than expected values by ± 10 %. Is a new calibration curve prepared for that analyte? yes

can curve be verified?,

10.4 Is a record maintained of the chromatographic conditions including retention time, MDL, column, detector, eluent used, flow rate of the eluent, size of injection loop and type of data system? Also as a suggestion, is a record kept of the background conductivity and system pressure to help diagnose potential problems? _____

in chr manual

1) time constant

11 Procedure

11.1 If other columns, detectors or chromatographic conditions are used, do they meet the requirements of Section 9.2? _____

11.3 If using manual injection, is the injection loop flushed thoroughly for each sample or is an automated sampler used? _____

11.4 Is the width of the retention window for each analyste determined daily? no

11.5 If the response for an unknown sample is outside the calibration range, is the sample rerun at a dilution? not limit SH

12 Data Analysis and Calculation

12.2 Are all unknown samples have values within the calibration curve? _____

12.3 Are all results reported in mg/L? _____

12.4 Are NO_2 and NO_2 results reported as mg/L N as well as PO_4^{-3} results reported as mg/L P? yes

12.5 Is a copy of the daily run schedule and the anions method provided with each data package in order that the data can be reconstructed? ~~N/A~~ Yes hand written

ash gel

Joe
Slayton/ESC/R3/USEPA/US
10/16/2006 05:38 PM

To WandaF Johnson/R3/USEPA/US@EPA
cc George Long/ESC/R3/USEPA/US, Dave Russell/ESC/R3/USEPA/US, Michelle Hoover/R3/USEPA/US, Robert Lange/R3/USEPA/US,
bcc
Subject Re: Brief update from our Trip to WV and help requested with some questions

WandaJ: Have another question/issue concerning the WV SDWA Water program. We had required the WV lab to notify customers of samples beyond holding time or not properly preserved. Qualifying such data is now a routine procedure at the laboratory for both Chemistry and Microbiology. DaveR's issue concerns just microbiology. The lab does notify the customer with a hardcopy lab report but the electronic data base does not allow the entry of such qualifer codes/notifications.
It was confirmed today that this does not apply to chemistry (only hardcopy provided) –microbiology submits both the electronic and hardcopy. We are considering this a program issue and not a laboratory certification issue/ Ex. 5 - Deliberative

Ex. 5 - Deliberative

Also...way down below on this message chain--you indicated when the sum of nitrate and nitrite is measure the action level is the MCL for nitrate (10 mg/L). I spoke today with Michelle Hoover and her read from the regs. to this point matches your response to my question. Apparently nitrite is only required initially (1999) and when new systems come on line. It is just odd that we certify for NO2 and NO3 separately (Bob Lange). MichelleH indicates she wants to do a little more digging but this is probably the way it will fall out. Thanks, JoeS

Joe
Slayton/ESC/R3/USEPA/US
10/14/2006 02:43 PM

To Dave Russell/ESC/R3/USEPA/US
cc larryduffield@wvdhhr.org, Charlottebillingsley@wvdhhr.org, tomOng@wvdhhr.org, George Long/ESC/R3/USEPA/US@EPA, Robin Costas/ESC/R3/USEPA/US@EPA
Subject Re: WV question

DaveR--right on schedule with your on-site report as per your promise. Thanks. Welcome back from your presentations, etc. DaveR, hope it is ok to share with our WV lab partners and gather a tad more information. I agree that this issue is very important, i.e., therefore a "finding type item", but I would recommend it is a finding for the Program and not the laboratory, since as your commendation indicates the lab has done its part. Given that our on-site assessment and report is focused on certification of the lab, would you be ok to put this as a recommendation--in the suggestion section, and include that the EPA assessors will work with the EPA WV Water Program Manager and her State WV program counter part and the WV Health Lab folks to get this resolved? *Also, you have reminded me to double check with WV folks to see if this same issue could be occurring with reporting of chemistry such as pH (hardcopy bench sheets indicating not for compliance purposes and an electronic report without the note)?* LarryD could you answer this question?

DaveR: Once all the facts are on the table (i.e., I might need to add the same recommendation to the chemistry report), we can send to Wanda Johnson and see how we can get this resolved so it meets her program needs. JoeS

resolved? Also, you have reminded me to double check with WV folks to see if this same issue could be occurring with reporting of chemistry such as pH (hardcopy bench sheets indicating not for compliance purposes
and an electronic report without the note)? LarryD could you answer this question?

DaveR: Once all the facts are on the table (i.e., I might need to add the same recommendation to the chemistry report), we can send to Wanda Johnson and see how we can get this resolved so it meets her program needs. JoeS

Dave

Russell/ESC/R3/

USEPA/US

To

Joe Slayton/ESC/R3/USEPA/US@EPA

10/13/2006

cc

12:52 PM

Subject

WV question

Hi Joe,

I know you're on vacation, but I understand you will be in a day or two
next week.

I'm nearly done with the WV micro report, but am uncertain as to how to
proceed with regard to the issue raised at the debriefing about the simultaneous reporting of results (via hardcopy report form and internet
database) to the Environmental Engineering Section of the Office of Environmental Health Services. The attached is taken from my report and
describes the problem. You had mentioned getting Wanda Johnson

Larry Duffield
<larryduffield@wvdhhr.org>
10/16/2006 10:52 AM

To Dave Russell/ESC/R3/USEPA/US@EPA, Joe Slayton/ESC/R3/USEPA/US@EPA
cc Robin Costas/ESC/R3/USEPA/US@EPA, George Long/ESC/R3/USEPA/US@EPA, Charlotte Billingsley <charlottebillingsley@wvdhhr.org>, Tom Ong
bcc
Subject Re: WV question

Joe,

Easy questions get fast answers. We only report chemistry results currently by hard copy, so the permanently footnoted pH results would be there for the data user. As I believe we told you during the on-site, chemistry will no longer be accepting or analyzing parameters that were received without proper preservation or beyond the holding time (except for pH which is flagged). Please see the attached letter we sent to sanitarians and engineers. Also attached is the most recently updated version of our report form.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

>>> <Slayton.Joe@epamail.epa.gov> 10/14 2:43 PM >>>
DaveR--right on schedule with your on-site report as per your promise. Thanks. Welcome back from your presentations, etc. DaveR, hope it is ok to share with our WV lab partners and gather a tad more information.
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on certification of the lab, would you be ok to put this as a recommendation--in the suggestion section, and include that the EPA assessors will work with the EPA WV Water Program Manager and her State
WV program counter part and the WV Health Lab folks to get this

involved. How to proceed? Should I include what I have written as a finding or a recommendation? Right now I can't decide. Would really like to see the problem addressed and I do agree involving Wanda is the
best approach. Anyway, read the attached and then let's talk next week.

Thanks,

Dave

(See attached file: Finding or Recommendation.doc)


000 - Master Laboratory Report Fo rm.xls


Ice Policy Letter.doc

Joe Slayton/ESC/R3/USEPA/US
10/24/2006 05:19 PM

To Pat Hurr/CI/USEPA/US,
cc Tom Ong <tomong@wvdhhr.org>, George Long/ESC/R3/USEPA/US,
bcc
Subject Re: Tracy's Certificate

PatH wondered if you folks keep a copy of the certificates or official record of COs completion of course. Looking for WV CO for microbiology Tracy Goodson
Tom Ong <tomong@wvdhhr.org>

Tom Ong <tomong@wvdhhr.org>
10/24/2006 10:37 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc
Subject Tracy's Certificate

I still don't have a copy of Tracy's certificate. She had to undergo knee surgery the first of October and has been out all month. She is scheduled to come back some time next week.

Thomas L. Ong, Microbiologist Supervisor
Chief - Laboratory Certification Officer
Chief - Laboratory Evaluation Officer
WVDHHR - BPH
Office of Laboratory Services
167 - 11th Avenue
South Charleston, WV 25303
Phone: 304-558-3530, Ext. 2710
email: tomong@wvdhhr.org

Joe Slayton/ESC/R3/USEPA/US
10/14/2006 02:20 PM

To Dave Russell/ESC/R3/USEPA/US
cc larryduffield@wvdhhr.org, Charlottebillingsley@wvdhhr.org, tomOng@wvdhhr.org, George Long/ESC/R3/USEPA/US, Robin Costas/ESC/R3/USEPA/US
bcc
Subject Re: WV question

DaveR--right on schedule with your on-site report as per your promise. Thanks. Welcome back from your presentations, etc. DaveR, hope it is ok to share with our WV lab partners and gather a tad more information. Ex. 5 - Deliberative

Ex. 5 - Deliberative

DaveR: Once all the facts are on the table (i.e., I might need to add the same recommendation to the chemistry report), we can send to Wanda Johnson and see how we can get this resolved so it meets her program needs. JoeS
Dave Russell/ESC/R3/USEPA/US

Dave Russell/ESC/R3/USEPA/US
10/13/2006 12:52 PM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc
Subject WV question

Hi Joe,

I know you're on vacation, but I understand you will be in a day or two next week.

I'm nearly done with the WV micro report Ex. 5 - Deliberative

Ex. 5 - Deliberative

attached is taken from my report and describes the problem. You had mentioned getting Wanda Johnson involved. How to proceed? Should I include what I have written as a finding or a recommendation? Right now I can't decide. Would really like to see the problem addressed and I do agree involving Wanda is the best approach. Anyway, read the attached and then let's talk next week.

Thanks,

Dave

Finding or Recommendation.doc

Ex. 5 - Deliberative

Dave Russell/ESC/R3/USEPA/US
09/26/2006 02:05 PM

To Robin Costas/ESC/R3/USEPA/US@EPA
cc George Long/ESC/R3/USEPA/US@EPA, Joe Slayton/ESC/R3/USEPA/US@EPA
bcc
Subject Re: W.Va travel notes

Looks good. Thanks for pulling it together. I would add that the Fairfield Marriot downtown is easy walking distance from Taylor's Bookstore (has art gallery, coffee bar and food and tables), the Farmer's Market, and Soho's Restuarant. Also, add ice cream shop across street from Taylor's Bookstore. We enjoyed it last time, but not this time.

Robin Costas/ESC/R3/USEPA/US

Robin Costas/ESC/R3/USEPA/US
09/25/2006 09:59 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA, Dave Russell/ESC/R3/USEPA/US@EPA, George Long/ESC/R3/USEPA/US@EPA
cc
Subject W.Va travel notes

Anything else to add? I saved this on J:\ASQAB\Inspections\State Lab Inspect Rpts & Rev\WV General\WVA travel notes 2006.doc

WVA travel notes 2006.doc
robin

Misc.

Robin
Costas/ESC/R3/USEPA/US
10/12/2006 12:13 PM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc Dave Russell/ESC/R3/USEPA/US@EPA, George Long/ESC/R3/USEPA/US@EPA
bcc
Subject WVa report

FYI, I received the information I needed for the Copper flame certification. So, I went into the last report, Joe, and removed all references on problems with copper flame. It should be ready to go as far as my part is concerned.
robin

used to indicate the possibility that the increased temperature of the samples during transit may have resulted in bacterial growth and falsely elevated HPC results.

The K-1 qualifier is based on the K qualifier "K = The identification of the analyte is acceptable; the reported value may be biased high. The actual value is expected to be less than the reported"

Additional Qualifier #2

L-1 = The heterotrophic plate count (HPC) exceeded 300 colony forming units per milliliter and the value reported is estimated using the method set forth in the 19th Edition of Standard Methods for the Examination of Water and Wastewater, Section 9215A.8

This qualifier replaces the following statement, which would have been included in the narrative:

> Because the heterotrophic plate counts (HPC) for sample 05101824 exceeded 300 colony forming units per milliliter, the count was estimated using the method set forth in the 19th Edition of Standard Methods for the Examination of Water and Wastewater, Section 9215A.8a.. The qualifier code C was also used to indicate that the result is an estimate rather than an actual count.

The L-1 qualifier is based on the L qualifier: "L = The identification of the analyte is acceptable; the reported value may be biased low. The actual value is expected to be greater than the reported value."

Please let me know ASAP is these are acceptable.

Fred

WV

Larry Duffield
<larryduffield@wvdhhr.org>

10/04/2006 08:29 AM

To Robin Costas/ESC/R3/USEPA/US@EPA
cc Joe Slayton/ESC/R3/USEPA/US@EPA
bcc
Subject Cu IDC

Robin,

We are mailing a copy of Patrick's Precision & Accuracy IDC for Cu by SM3111B to you today.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

Ex. 5 - Deliberative

Ex. 5 - Deliberative

W.Va trip notes:

- get hotel downtown, maybe Fairfield Marriott instead of Wingate.
- Don't eat at Soho's Italian place. Wine good though.
- Taylors Bookstore closes at 8 pm on Capital street. Go for soup and coffee, too.
- Mall downtown...Sue likes the dolmatas on the food court (3rd floor)
- Chili's is good – right outside the mall.
- Can run down by the river on the path – downtown.
- Only have a Hardees at Big Chimney.
- Farmer's Market closes at 6pm.
- Robin and Dave flew in on Mon but didn't start till 9am on Tues. Left at 5pm on Wed. but could have easily left sooner.
- Panera's and lots of food places aout 64 west then 119 S.
- Robin parked at Daily parking for $10 per 24hrs (total of $30). Really easy to get in and out of.

J:\ASQAB\Inspections\State Lab Inspect Rpts & Rev\WV General\WVA travel notes 2006.doc

EPA Document # EPA 815-B-01-001

METHOD 317.0 DETERMINATION OF INORGANIC OXYHALIDE DISINFECTION BY-PRODUCTS IN DRINKING WATER USING ION CHROMATOGRAPHY WITH THE ADDITION OF A POSTCOLUMN REAGENT FOR TRACE BROMATE ANALYSIS

Revision 2.0

July 2001

Herbert P. Wagner and Barry V. Pepich, IT Corporation and Daniel P. Hautman and David J. Munch, US EPA, Office of Ground Water and Drinking Water

TECHNICAL SUPPORT CENTER
OFFICE OF GROUND WATER AND DRINKING WATER
U. S. ENVIRONMENTAL PROTECTION AGENCY
CINCINNATI, OHIO 45268

METHOD 317.0

DETERMINATION OF INORGANIC OXYHALIDE DISINFECTION BY-PRODUCTS IN DRINKING WATER USING ION CHROMATOGRAPHY WITH THE ADDITION OF A POSTCOLUMN REAGENT FOR TRACE BROMATE ANALYSIS

1. SCOPE AND APPLICATION

1.1 This method covers the determination of inorganic oxyhalide disinfection by-product anions in reagent water, surface water, ground water, and finished drinking water. In addition, bromide can be accurately determined in source or raw water and it has been included due to its critical role as a disinfection by-product precursor. Bromide concentration in finished water can differ significantly between preserved and unpreserved samples and should not be attempted due to numerous variables which can influence the concentration. Since this method, prior to the addition of the postcolumn reagent (PCR), employs the same hardware as EPA Method 300.1[1], the analysis of the common anions (using EPA Method 300.1, Part A[1]) can be performed using this instrument setup with the postcolumn hardware attached but "off-line" and with the appropriate smaller sample loop.

Inorganic Disinfection By-products by Conductivity Detection

Bromate (report values > 15.0 ug/L)	Chlorite
Bromide (source or raw water only)	Chlorate

Inorganic Disinfection By-product by Postcolumn UV/VIS Absorbance Detection

Bromate (report values > Minimum Reporting Limit (MRL) to 15.0 ug/L)

1.2 The single laboratory reagent water Method Detection Limits (MDL, defined in Section 3.14) for the above analytes are listed in Table 1. The MDL for a specific matrix may differ from those listed, depending upon the nature of the sample and the specific instrumentation employed.

1.2.1 In order to achieve comparable detection limits on the conductivity detector, an ion chromatographic system must utilize suppressed conductivity detection, be properly maintained and must be capable of yielding a baseline with no more than 5 nanosiemen (nS) noise/drift per minute of monitored response over the background conductivity.

1.2.2 In order to achieve acceptable detection limits on the postcolumn absorbance detector, the postcolumn reagent must be delivered pneumatically and some form of software signal filtering or smoothing of the absorbance signal from the absorbance detector must be incorporated.[2]

1.3 This method is recommended for use only by or under the supervision of analysts experienced in the use of ion chromatography and in the interpretation of the resulting ion chromatograms.

1.4 When this method is used to analyze unfamiliar samples for any of the above anions, anion identification should be supported by the use of a fortified sample matrix covering the anions of interest. The fortification procedure is described in Section 9.4.1.

1.5 Users of the method data should state the data quality objectives prior to analysis. Users of the method must demonstrate the ability to generate acceptable results with this method, using the procedures described in Section 9.0.

2. SUMMARY OF METHOD

2.1 A volume of sample, approximately 225 µL (see Note), is introduced into an ion chromatograph (IC). The anions of interest are separated and measured, using a system comprised of a guard column, analytical column, suppressor device, conductivity detector, a postcolumn reagent delivery system (pneumatically controlled), a heated postcolumn reaction coil, and a ultraviolet/visible (UV/VIS) absorbance detector.[2,3]

NOTE: A 225 uL sample loop can be made using approximately 111 cm (44 inches) of 0.02 inch i.d. PEEK tubing. Larger injection loops may be employed.[4] The volume should be verified to be within 5% by weighing the sample loop empty, filling the loop with deionized water and re-weighing the loop assuming the density of water is 1 mg/uL.

3. DEFINITIONS

3.1 ANALYSIS BATCH – A sequence of samples, which are analyzed within a 30 hour period and include no more than 20 field samples. An analysis batch must also include all required QC samples, which do not contribute to the maximum field sample total of 20. The required QC samples include:

- Laboratory Reagent Blank (LRB)
- Initial Calibration Check Standard (ICCS)
- Laboratory Fortified Blank (LFB)
- Continuing Calibration Check Standard (CCCS), when the batch contains more than 10 field samples
- End Calibration Check Standard (ECCS)
- Laboratory Fortified Matrix (LFM)
- Either a Field Duplicate (FD), a Laboratory Duplicate (LD) or a duplicate of the LFM

3.2 CALIBRATION STANDARD (CAL) – A solution prepared from the primary dilution standard solution(s) or stock standard solutions and the surrogate analyte. The CAL

solutions are used to calibrate the instrument response with respect to analyte concentration.

3.3 INITIAL CALIBRATION STANDARDS – A series of CAL solutions (either individual or combined target analytes) used to initially establish instrument calibration and develop calibration curves for individual target anions (Section 10.2).

3.4 INITIAL CALIBRATION CHECK STANDARD (ICCS) – A CAL solution, (either individual or combined target analytes) which is analyzed initially, prior to any field sample analyses, which verifies previously established calibration curves. The concentration for the initial calibration check standard MUST be at or below the MRL (Section 3.15) level which is also the level of the lowest calibration standard (Section 10.3.1).

3.5 CONTINUING CALIBRATION CHECK STANDARDS (CCCS) – A CAL solution (either individual or combined target analytes) which is analyzed after every tenth field sample analyses which verifies the previously established calibration curves and confirms accurate analyte quantitation for the previous ten field samples analyzed. The concentration for the continuing calibration check standards should be either at a middle calibration level or at the highest calibration level (Section 10.3.2).

3.6 END CALIBRATION CHECK STANDARD (ECCS) – A CAL solution (either individual or combined target analytes) which is analyzed after the last field sample analysis which verifies the previously established calibration curves and confirms accurate analyte quantitation for all field samples analyzed since the last continuing calibration check. The end calibration check standard should be either the middle or high level continuing calibration check standard (Section 10.3.2).

3.7 FIELD DUPLICATES (FD) – Two separate field samples collected at the same time and place under identical circumstances and handled exactly the same throughout field and laboratory procedures. Analyses of field duplicates indicate the precision associated with sample collection, preservation and storage, as well as with laboratory procedures.

3.8 INSTRUMENT PERFORMANCE CHECK SOLUTION (IPC) – A solution of one or more method analytes, surrogates, or other test substances used to evaluate the performance of the instrument system with respect to a defined set of criteria.

3.9 LABORATORY DUPLICATE (LD) – Two sample aliquots, taken in the laboratory from a single field sample bottle, and analyzed separately with identical procedures. Analysis of the initial sample (I_C) and the duplicate sample [(D_C) Section 9.4.3.1] indicate precision associated specifically with the laboratory procedures by removing variation contributed from sample collection, preservation and storage procedures.

3.10 LABORATORY FORTIFIED BLANK (LFB) – An aliquot of reagent water or other blank matrix to which known quantities of the method analytes are added in the laboratory. The LFB is analyzed exactly like a sample, and its purpose is to determine whether the methodology is in control, and whether the laboratory is capable of making accurate and precise measurements.

3.11 LABORATORY FORTIFIED SAMPLE MATRIX (LFM) – An aliquot of an environmental field sample to which known quantities of the method analytes are added in the laboratory. The LFM is analyzed exactly like a sample, and its purpose is to determine whether the field sample matrix contributes bias to the analytical result. The background concentrations of the analytes in the field sample matrix must be determined in a separate, unfortified aliquot and the measured values in the LFM corrected for background concentrations.

3.12 LABORATORY REAGENT BLANK (LRB) – An aliquot of reagent water or other blank matrix that is handled exactly as a sample including exposure to all glassware, equipment, solvents, reagents, and surrogates that are used with other samples. The LRB is used to determine if method analytes or other interferences are present in the laboratory environment, the reagents, or the apparatus.

3.13 MATERIAL SAFETY DATA SHEET (MSDS) – Written information provided by vendors concerning a chemical's toxicity, health hazards, physical properties, fire, and reactivity data including storage, spill, and handling precautions.

3.14 METHOD DETECTION LIMIT (MDL) – The minimum concentration of an analyte that can be identified, measured and reported with 99% confidence that the analyte concentration is greater than zero.[5]

3.15 MINIMUM REPORTING LEVEL (MRL) – The minimum concentration that can be reported as a quantitated value for a target analyte in a sample following analysis. This defined concentration can be no lower than the concentration of the lowest calibration standard and can only be used if acceptable quality control criteria for the ICCS are met.

3.16 PROFICIENCY TESTING (PT) or PERFORMANCE EVALUATION (PE) SAMPLE – A certified solution of method analytes whose concentration is unknown to the analyst. Frequently, an aliquot of this solution is added to a known volume of reagent water and analyzed with procedures used for samples. Often, results of these analyses are used as part of a laboratory certification program to objectively determine the capabilities of a laboratory to achieve high quality results.

3.17 QUALITY CONTROL SAMPLE (QCS) – A solution of method analytes of known concentrations that is obtained from a source external to the laboratory and different from the source of calibration standards. It is used to check laboratory performance with externally prepared test materials.

3.18 SURROGATE ANALYTE – An analyte added to all samples, standards, blanks, etc., which is unlikely to be found at a significant concentration, and which is added directly in a known amount before any sample processing procedures are conducted (except in the procedure for the removal of chlorite as described is Section 11.1.4). It is measured with the same procedures used to measure other sample components. The purpose of the surrogate analyte is to monitor method performance with each sample.

3.19 STOCK STANDARD SOLUTION (SSS) – A concentrated solution containing one or more method analytes prepared in the laboratory using assayed reference materials or purchased from a reputable commercial source.

4. INTERFERENCES

4.1 Interferences can be divided into three different categories: direct chromatographic coelution, where an analyte response is observed at very nearly the same retention time as the target anion; concentration dependant coelution, which is observed when the response of higher than typical concentrations of the neighboring peak overlap into the retention window of the target anion; and, ionic character displacement, where retention times may significantly shift due to the influence of high ionic strength matrices (high mineral content or hardness) overloading the exchange sites on the column and significantly shortening target analyte's retention times.

4.1.1 A direct chromatographic coelution may be solved by changing columns, eluent strength, modifying the eluent with organic solvents (if compatible with IC columns), changing the detection systems, or selective removal of the interference with pretreatment. Sample dilution will have little to no effect. The analyst must verify that these changes do not induce any negative affects on method performance by repeating and passing all the QC criteria as described in Section 9.

4.1.2 Sample dilution may resolve some of the difficulties if the interference is the result of either concentration dependant coelution or ionic character displacement, but it must be clarified that sample dilution will alter your Minimum Reporting Limit (MRL) by a proportion equivalent to that of the dilution. Therefore, careful consideration of project objectives should be given prior to performing such a dilution. An alternative to sample dilution, may be dilution of the eluent as outlined in Section 11.2.6.

4.1.3 Pretreatment cartridges can be effective as a means to eliminate certain matrix interferences. With any proposed pretreatment, the analyst must verify that target analyte(s) are not affected by monitoring recovery after pretreatment. With advances in analytical separator column technology which employ higher capacity anion exchange resins, the need for these cartridges has been greatly reduced.

4.2 Method interferences may be caused by contaminants in the reagent water, reagents, glassware, and other sample processing apparatus that lead to discrete artifacts or elevated baselines in an ion chromatogram. These interferences can lead to false positive results for target analytes as well as reduced detection limits as a consequence of elevated baseline noise.

4.3 Samples that contain particles larger than 0.45 microns and reagent solutions that contain particles larger than 0.20 microns require filtration to prevent damage to instrument columns and flow systems.

4.4 Close attention should be given to the potential for carry over peaks from one analysis which will effect the proper detection of analytes of interest in a second or subsequent analysis. Normally, in this analysis, the elution of sulfate (retention time of 17.5 min.) indicates the end of a chromatographic run, but, in the ozonated and chlorine dioxide matrices, which were included as part of the single operator accuracy and bias study, a small response (200 nS baseline rise) was observed for a very late eluting unknown peak following the response for sulfate. Consequently, a run time of 25 minutes is recommended to allow for the proper elution of any potentially interferant late peaks. It is the responsibility of the user to confirm that no late eluting peaks have carried over into a subsequent analysis thereby compromising the integrity of the analytical results.

4.5 Any residual chlorine dioxide present in the sample will result in the formation of additional chlorite prior to analysis. If residual chlorine dioxide is suspected in the sample, the sample must be purged with an inert gas (helium, argon or nitrogen) for approximately five minutes. This sparging must be conducted prior to ethylenediamine preservation and at the time of sample collection.

4.6 The presence of chlorite can interfere with the quantitation of low concentrations of bromate on the postcolumn UV/VIS absorbance detector. In order to accurately quantify bromate concentrations in the range 0.5 - 15.0 µg/L in this postcolumn system, the excess chlorite must be removed prior to analysis as outlined in Section 11.1.4.

5. SAFETY

5.1 The toxicity or carcinogenicity of each reagent used in this method have not been fully established although the postcolumn reagent o-dianisidine, is listed as a potential human carcinogen. Each chemical should be regarded as a potential health hazard and exposure should be as low as reasonably achievable. Cautions are included for known extremely hazardous materials or procedures.

5.2 Each laboratory is responsible for maintaining a current awareness file of Occupational Safety and Health Administration (OSHA) regulations regarding the safe handling of the chemicals specified in this method. A reference file of Material Safety Data Sheets (MSDS) should be made available to all personnel involved in the chemical analysis.

The preparation of a formal safety plan is also advisable. Additional references on laboratory safety are available.[6-9]

5.3 The following chemicals have the potential to be highly toxic or hazardous, consult MSDS.

5.3.1 Sulfuric acid – used to prepared a 25 mN sulfuric acid regenerant solution for chemical suppression using a Dionex Anion Micro Membrane Suppressor (AMMS) and for pretreatment for chlorite removal (Section 11.1.4)

5.3.2 Nitric acid – used to prepare the postcolumn reagent.

5.3.3 *o*-dianisidine [3, 3'- dimethoxybenzidine dihydrochloride (ODA)] – used as the postcolumn reagent.

6. EQUIPMENT AND SUPPLIES

6.1 Ion chromatograph – Analytical system complete with ion chromatographic pump and all required accessories including syringes, analytical columns, compressed gasses, suppressor, conductivity detector, mixing "tee", postcolumn reagent delivery system, reaction coil, reaction coil heater, UV/VIS absorbance detector (Figure 1) and a PC based data acquisition and control system.

NOTE: Because of its acidic nature and high salt content, the PCR MUST be flushed from the reaction coil upon completion of the final analysis and prevented from draining through the reaction coil by gravity once the system is shut down. This can be accomplished either manually or by incorporating a column switching valve in combination with a flush and close method in the schedule.

6.1.1 Anion guard column – Dionex AG9-HC 4 mm (P/N 51791), or equivalent. This column functions as a protector of the separator column. If omitted from the system the retention times will be shorter.

6.1.2 Anion separator column – Dionex AS9-HC column, 4 mm (P/N 51786), or equivalent (see Note). The AS9-HC, 4 mm column using the conditions outlined in Table 1 produced the separations shown in Figures 2 and 3.

NOTE: The use of 2 mm columns is not recommended. A 50 uL sample loop would be required with the 2 mm columns. This reduced injection volume would decrease the "on-column" bromate and negatively affect PCR reactivity and the subsequent absorbance response. As well, the 2 mm columns require a flow rate approximately 4 times less than the 4 mm columns. At the lower flow rates, band broading may become an issue and it would be difficult, if not impossible, to accurately maintain the appropriate reduced flow rate for the PCR.

6.1.3 Anion suppressor device – The data presented in this method were generated using a Dionex Anion Self Regenerating Suppressor (4 mm ASRS, P/N 46081). An equivalent suppressor device may be utilized provided comparable conductivity detection limits are achieved and adequate baseline stability is attained as measured by a combined baseline drift/noise of no more than 5 nS per minute over the background conductivity. The suppressor must be able to withstand approximately 80 - 120 psi back pressure which results from connecting the postcolumn hardware to the eluent out side of the suppressor.

6.1.3.1 The ASRS was set to perform electrolytic suppression at a current setting of 100 mA using the external water mode. Insufficient baseline stability was observed on the conductivity detector using the ASRS in recycle mode.

6.1.3.2 This method was developed as a multiple component procedure employing both suppressed conductivity and postcolumn UV/VIS absorbance detectors in series. If a laboratory is exclusively interested in monitoring trace bromate using the PCR and the UV/VIS absorbance detector, the suppressor may not be required. The performance data presented within this method for the PCR and UV/VIS absorbance detector, is based upon a suppressed mobile phase system. A laboratory must generate comparable data as a result of a complete IDC (Section 9.2) in order to demonstrate comparability of a non suppressed system.

6.1.4 Detector – Conductivity cell (Dionex CD20, or equivalent) capable of providing data as required in Section 9.2.

6.1.5 Detector – Absorbance detector (Dionex AD20 or equivalent with 10 mm cell pathlength, equipped with a tungsten source bulb, or equivalent and capable of measuring absorbance at 450 nm) capable of providing data as required in Section 9.2.

6.1.6 Postcolumn reagent delivery system (Dionex PC-10, or equivalent), pneumatically delivers the postcolumn reagent to mixing tee. The pressure settings will need to be established on an individual basis for each specific instrument configuration and at a level which yields the prescribed PCR flow rates.

6.1.7 Reaction Coil, 500 uL internal volume, knitted, potted or configured to fit securely in the postcolumn reaction coil heater. (Dionex P/N 39349, or equivalent).

6.1.8 Postcolumn Reaction Coil Heater, capable of maintaining a temperature of up to 80°C. (Dionex PCH-2, or equivalent).

6.2 Data System – The Dionex Peaknet Data Chromatography Software was used to generate all the data in the attached tables. Other computer based data systems may achieve approximately the same MDLs but the user must demonstrate this by the procedure outlined in Section 9.2.

6.3 Analytical balance – Used to accurately weigh target analyte salts for stock standard preparation (±0.1 mg sensitivity).

6.4 Top loading balance – Used to accurately weigh reagents to prepare eluents (±10 mg sensitivity).

6.5 Weigh boats – Plastic, disposable - for weighing eluent reagents.

6.6 Syringes – Plastic, disposable, 10 mL - used during sample preparation.

6.7 Pipets – Pasteur, plastic or glass, disposable, graduated, 5 mL and 10 mL.

6.8 Bottles – High density polyethylene (HDPE), opaque or glass, amber, 30 mL, 125 mL, 250 mL, used for sample collection and storage of calibration solutions. Opaque or amber bottles are required due to the photoreactivity of the chlorite anion.

6.9 Micro beakers – Plastic, disposable - used during sample preparation.

6.10 Particulate filters – Gelman ion chromatography Acrodisc 0.45 micron (PN 4485) syringe filters or equivalent. These cartridges are used to remove particulates and [$Fe(OH)_{3(s)}$] which is formed during the oxidation-reduction reaction between Fe (II) and ClO_2^-.

6.11 Hydrogen cartridges – Dionex OnGuard-H cartridges (PN 039596) or equivalent. These cartridges are conditioned according to the manufacturer's directions and are used to protect the analytical column and the suppressor membrane by removing excess ferrous iron [Fe (II)]. The ferrous iron is added to field samples to reduce chlorite levels prior to analysis of chlorine dioxide disinfected water samples.

7. REAGENTS AND STANDARDS

7.1 Reagent water – Distilled or deionized water 18 MΩ or better, free of the anions of interest. Water should contain particles no larger than 0.20 microns.

7.2 Eluent solution – Sodium carbonate (CASRN 497-19-8) 9.0 mM. Dissolve 1.91 g sodium carbonate (Na_2CO_3) in reagent water and dilute to 2 L.

7.2.1 This eluent solution must be purged for 10 minutes with helium prior to use to remove dissolved gases which may form micro bubbles in the IC compromising system performance and adversely effecting the integrity of the data. Alternatively, an in-line degas apparatus may be employed.

7.3 Stock standard solutions, 1000 mg/L (1 mg/mL) – Stock standard solutions may be purchased as certified solutions or prepared from ACS reagent grade potassium or sodium salts as listed below, for most analytes. Chlorite requires careful consideration as outlined below in Section 7.3.4.1.

7.3.1 Bromide (Br^-) 1000 mg/L – Dissolve 0.1288 g sodium bromide (NaBr, CASRN 7647-15-6) in reagent water and dilute to 100 mL in a volumetric flask.

7.3.2 Bromate (BrO_3^-) 1000 mg/L – Dissolve 0.1180 g of sodium bromate ($NaBrO_3$, CASRN 7789-38-0) in reagent water and dilute to 100 mL in a volumetric flask.

7.3.3 Chlorate (ClO_3^-) 1000 mg/L – Dissolve 0.1275 g of sodium chlorate ($NaClO_3$, CASRN 7775-09-9) in reagent water and dilute to 100 mL in a volumetric flask.

7.3.4 Chlorite (ClO_2^-) 1000 mg/L – If the amperometric titration of the technical grade sodium chlorite ($NaClO_2$), specified in 7.3.4.1, had indicated the purity of the salt to be 80.0 % $NaClO_2$, the analyst would dissolve 0.1676 g of sodium chlorite ($NaClO_2$, CASRN 7758-19-2) in reagent water and dilute to 100 mL in a volumetric flask.

7.3.4.1 High purity sodium chlorite ($NaClO_2$) is not currently commercially available due to its potential explosive instability. Recrystallization of the technical grade (approx. 80%) can be performed but it is labor intensive and time consuming. The simplest approach is to determine the exact purity of the $NaClO_2$ using the iodometric titration procedure.[10] Following titration, an individual component standard of chlorite must be analyzed to determine if there is any significant contamination (greater than 1% of the chlorite weight) from chlorate, bromate or bromide (as other method target anions) in the technical grade chlorite standard.

NOTE: Stability of standards – Stock standards (Section 7.3) for most anions are stable for at least 6 months when refrigerated at <6°C. The chlorite standard is only stable for two weeks when stored refrigerated at <6°C and protected from light. Dilute working standards should be prepared monthly, except those that contain chlorite, which must be prepared every two weeks or sooner if signs of degradation are indicated by repeated QC failure.

7.4 Ethylenediamine (EDA) preservation solution, 100 mg/mL – Dilute 2.8 mL of ethylenediamine (99%) (CASRN 107-15-3) to 25 mL with reagent water. Prepare fresh monthly.

7.5 Surrogate Solution, 0.50 mg/mL dichloroacetate (DCA) – Prepare by dissolving 0.065 g dichloroacetic acid, potassium salt (Cl_2CHCO_2K, CASRN 19559-59-2) in reagent water and diluting to 100 mL in a volumetric flask.

7.5.1 Dichloroacetate is potentially present in treated drinking waters as the acetate of the organic disinfection by product, dichloroacetic acid (DCAA). Typical concentrations of DCAA rarely exceed 50 µg/L, which, for this worst case example, would represent only a five percent increase in the observed response over the fortified concentration of 1.00 mg/L. Consequently, the criteria for acceptable recovery (90% to 115%) for the surrogate is weighted to 115% to allow for this potential background.

7.5.2 Prepare this solution fresh every 3 months or sooner if signs of degradation are indicated by the repeated failure of the surrogate QC criteria.

7.5.3 If the analyst is exclusively interested in monitoring trace bromate using the PCR and the UV/VIS absorbance detector, the surrogate may be omitted since it only yields a signal on the conductivity detector. If the surrogate is removed, the laboratory must adhere to the alternate QC requirements found in Section 9.3.3.3 in order to monitor and demonstrate proper instrument performance.

7.6 Postcolumn reagent – The postcolumn reagent is prepared by adding 40 mL of 70% redistilled nitric acid (purity as 99.999+%, Aldrich, Cat. No. 22,571-1, Milwaukee, WI, or equivalent) to approximately 300 mL reagent water (see Note 1) in a well rinsed 500 mL volumetric flask (see Note 2) and adding 2.5 grams of ACS reagent grade KBr (Sigma, Cat. No. P-5912, St. Louis, MO, or equivalent). Two-hundred-and-fifty milligrams of purified grade o-dianisidine, dihydrochloride salt [(ODA), (Sigma, Cat. No. D-3252, or equivalent)] are dissolved, with stirring, in 100 mL methanol (Spectrophotometric grade, Sigma, Cat. No. M-3641, St. Louis MO, or equivalent). After dissolution, the o-dianisidine solution is added to the nitric acid/KBr solution and diluted to volume with reagent water. The reagent is stable for 24 hours and should be prepared fresh daily prior to analysis.

7.6.1 The purity of all reagents employed in the preparation of the postcolumn reagent is critical. Some commercial manufacturers/suppliers of laboratory chemicals sell inferior grades of o-dianisidine dihydrochloride. ONLY the purified grade of this reagent is acceptable (see Notes 3 and 4). The purified ODA dihydrochloride salt is a white, fine powder.

NOTE 1: For selected lots of ODA, the method sensitivity monitored by the UV-vis detector may be increased by as much as 2-fold if the reagent water used to prepare the ODA PCR is purged with helium for 30 minutes prior to preparing the ODA solution.

NOTE 2: All glassware used to prepare the postcolumn reagent must be thoroughly rinsed with reagent water prior to use. A champagne or light amber coloration of the PCR reagent may be evident when freshly prepared. Over several hours, this slight coloration will fade. Consequently, the PCR must be prepared in advance and allowed to sit until it is clear, for a minimum of 4 hours (preferably overnight) prior to use. Occasionally, no matter how well all the glassware used to prepare the postcolumn reagent is rinsed, a darkly colored solution (oxidized ODA) may result. These solutions MUST be discarded. For this reason, it is recommended that the PCR be made in a series of 500 mL lots with dedicated glassware. The clear solution should be filtered using a 0.45 micron membrane to remove particulates before use.

NOTE 3: Differences in purity as indicated by variations in the physical appearance of different lots of ODA, even from the same manufacturer can effect method sensitivity. Although considerably more expensive, a pelletized form of ODA from one supplier (Sigma, Cat. No. D-9154, St. Louis, MO) has shown to increase method sensitivity by as much as 2-fold over impure lots of ODA. Care must be exercised when switching ODA lots to ensure the method sensitivity is not compromised.

NOTE 4: The PCR reaction temperature was optimized at 60 °C with the granular ODA that was available during the original method development. Investigation of recent changes in physical appearance/decreased sensitivity and stability of the ODA PCR indicated that, the method sensitivity with the ODA currently available, can be dramatically increased (up to 180%) or increased by up to a factor of 1.8) by increasing the reaction temperature to 80 °C. Use of temperatures ranging from 60 to 80 °C may be used in this method.

7.7 Ferrous iron [1000 mg/L Fe (II)] solution – Dissolve 0.124 g ferrous sulfate heptahydrate ($FeSO_4 \cdot 7H_2O$, Sigma, F-7002) in approximately 15 mL reagent water containing 6 uL concentrated nitric acid and dilute to 25 mL with reagent water in a volumetric flask (final pH ~2). The Fe (II) solution must be prepared fresh every two days.

7.8 Sulfuric acid (0.5 N) – Dilute 1.4 mL of concentrated sulfuric acid (Fisher Scientific Certified ACS Plus, A 300-500) to 100 mL.

8. SAMPLE COLLECTION, PRESERVATION AND STORAGE

8.1 Samples should be collected in plastic or glass bottles. All bottles must be thoroughly cleaned and rinsed with reagent water. The volume collected should be sufficient to insure a representative sample, allow for replicate analysis and laboratory fortified matrix analysis, if required, and minimize waste disposal.

8.2 Special sampling requirements and precautions for chlorite.

8.2.1 Sample bottles used for chlorite analysis must be opaque or amber to protect the sample from light.

8.2.2 When preparing the LFM, be aware that chlorite is an oxidant and may react with the natural organic matter in an untreated drinking water matrix as a result of oxidative demand. If untreated water is collected for chlorite analysis, and subsequently used for the LFM, EDA preservation will not control this demand and reduced chlorite recoveries may be observed.

8.3 Sample preservation and holding times for the anions are as follows:

Analyte	Preservation	Holding Time
Bromate	50 mg/L EDA, refrigerate at <6°C	28 days
Chlorate	50 mg/L EDA, refrigerate at <6°C	28 days
Chlorite	50 mg/L EDA, refrigerate at <6°C	14 days
Bromide (source/raw water only)	EDA permitted, refrigerate at <6°C	28 days

NOTE: Samples for chlorite analysis must arrive at the laboratory within 48 hours of collection and must be received at 10°C or less.

8.4 When collecting a field sample from a treatment plant employing chlorine dioxide, the field sample must be sparged with an inert gas (helium, argon, nitrogen) prior to addition of the EDA preservative at time of sample collection.

8.5 All four anions (bromate > 15.0 ug/L) can be analyzed by conductivity, in a sample matrix which has been preserved with EDA. Add a sufficient volume of the EDA preservation solution (Section 7.4) such that the final concentration is 50 mg/L in the sample. This would be equivalent to adding 0.5 mL of the EDA preservation solution to 1 L of sample.

8.6 Chlorite is susceptible to degradation both through catalytic reactions with dissolved iron salts and reactivity towards free chlorine which exists as hypochlorous acid/hypochlorite ion in most drinking water as a residual disinfectant.[11] EDA serves a dual purpose as a preservative for chlorite by chelating iron as well as any other catalytically destructive metal cations and removing hypochlorous acid/hypochlorite ion by forming an organochloramine. EDA preservation of chlorite also preserves the integrity of chlorate which can increase in unpreserved samples as a result of chlorite

degradation. EDA also preserves the integrity of bromate concentrations by binding with hypobromous acid/hypobromite ion which is an intermediate formed as a by-product of the reaction of either ozone or hypochlorous acid/hypochlorite ion with bromide ion. If hypobromous acid/hypobromite ion is not removed from the matrix, further reactions may form bromate ion.

9. QUALITY CONTROL

9.1 Each laboratory using this method is required to operate a formal quality control (QC) program. The requirements of this program consist of an initial demonstration of laboratory capability (IDC), and subsequent analysis in each analysis batch (Section 3.1) of a Laboratory Reagent Blank (LRB), Initial Calibration Check Standard (ICCS), Laboratory Fortified Blank (LFB), Instrument Performance Check Standard (IPC), Continuing Calibration Check Standards (CCCS), Laboratory Fortified Sample Matrix (LFM) and either a Field, Laboratory or LFM duplicate sample analysis. This section details the specific requirements for each of these QC parameters for both the conductivity and absorbance detectors used in this application. Although this method involves both conductivity and absorbance detection, the MDLs and MRLs may differ but the QC requirements and acceptance criteria are the same for both detectors. The QC criteria discussed in the following sections are summarized in Section 17, Tables 4 and 5. The laboratory is required to maintain performance records that define the quality of the data that are generated.

9.2 INITIAL DEMONSTRATION OF CAPABILITY

9.2.1 The Initial Demonstration of Capability (IDC) – This is used to characterize instrument and laboratory performance prior to performing analyses by this method. The QC requirements for the IDC discussed in the following section are summarized in Section 17, Table 4.

9.2.2 Initial demonstration of low system background – Section 9.3.1.

9.2.3 Initial Demonstration of Precision (IDP) – For the 4 conductivity detector analytes, prepare 7 replicate LFBs fortified at a recommended concentration of 20 ug/L. For the absorbance detector, prepare 7 replicate LFBs fortified at a recommended concentration of 2.0 ug/L bromate. The percent relative standard deviation (RSD) of the results must be less than 20%.

9.2.4 Initial Demonstration of Accuracy (IDA) – Using the data generated for Section 9.2.3, calculate the average recovery. The average recovery of the replicate values must be within ± 15% of the true value.

9.2.5 Quality Control Sample (QCS) – After calibration curves have initially been established or have been re-established, on a quarterly basis or as required to meet data quality needs, verify both the calibration and acceptable instrument performance with the preparation and analyses of an external/second source QCS. If the determined concentrations are not within ± 20% of the stated values, performance of the method is unacceptable. The source of the problem must be identified and corrected before proceeding with the IDC.

9.2.6 Method Detection Limit (MDL) – MDLs must be established for all analytes, using reagent water (blank) fortified at a concentration of three to five times the estimated instrument detection limit.[4] To determine MDL values, take seven replicate aliquots of the fortified reagent water and process through the entire analytical method. The replicates must be prepared and analyzed over three days. Report the concentration values in the appropriate units. Calculate the MDL as follows:

$$MDL = (t) \times (S)$$

where, t = student's t value for a 99% confidence level and a standard deviation estimate with n-1 degrees of freedom [t = 3.14 for seven replicates], and
S = standard deviation of the replicate analyses.

9.2.6.1 MDLs should be periodically verified, but MUST be initially determined when a new operator begins work or whenever there is a significant change in the background, or instrument response.

NOTE: Do not subtract blank values when performing MDL calculations.

9.2.7 Minimum Reporting Level (MRL) – The MRL is the threshold concentration of an analyte that a laboratory can expect to accurately quantitate in an unknown sample. The MRL should be established at an analyte concentration either greater than three times the MDL or at a concentration which would yield a response greater than a signal to noise ratio of five. Setting the MRL too low may cause repeated QC failure upon analysis of the ICCS. Although the lowest calibration standard may be below the MRL, the MRL must never be established at a concentration lower than the lowest calibration standard.

9.3 ASSESSING LABORATORY PERFORMANCE

9.3.1 Laboratory Reagent Blank (LRB) – The laboratory must analyze at least one LRB with each analysis batch (Section 3.1). Data produced are used to assess

contamination from the laboratory environment. Values that exceed ½ the MRL indicate a laboratory or reagent contamination is present. If a method analyte is observed in the LRB it must not exceed ½ the MRL. Analytes that exceed this level will invalidate the analysis batch for that method analyte in all corresponding field samples.

9.3.1.1 EDA must be added to the LRB at 50 mg/L. By including EDA in the LRB, any bias as a consequence of the EDA which may be observed in the field samples, particularly in terms of background contamination, will be identified.

9.3.1.2 When the PCR method is used for low level bromate analysis on samples from public water systems (PWSs) which employ chlorine dioxide disinfection, the matrix must be pretreated to remove the potentially interferant chlorite anion (Section 11.1.4). When these types of pretreated samples, or any type of pretreatment is applied to field samples included as part of an analysis batch, a second LRB must be prepared, pretreated and analyzed to confirm no background effects of the pretreatment are present. If the analysis batch contains only pretreated samples, then only a pretreated LRB is required.

9.3.2 Laboratory Fortified Blank (LFB) – Prepare a secondary dilution stock using the same stock solutions used to prepare the calibration standards and the LFM fortification solution. Since calibration solutions are prepared in large volumes and can be used over an extended period of time, the integrity of the concentration of the solution used to fortify the LFM is checked by analyzing the LFB. The recovery of all analytes must fall in the acceptable recovery range, as indicated below, prior to analyzing samples. If the LRB recovery for an analysis batch does not meet these recovery criteria the data are considered invalid, and the source of the problem must be identified and resolved before continuing with analyses.

LFB Fortified Concentration range	LFB Percent Recovery Limits
MRL to 5 x MRL	75 - 125 %
5 x MRL to highest calibration level	85 - 115 %

9.3.2.1 EDA must be added to the LFB at 50 mg/L. The addition of EDA to all reagent water prepared calibration and quality control samples is required not as a preservative but rather as a means to normalize any bias attributed by the presence of EDA in the field samples.

9.3.3 Instrument Performance Check (IPC) – The Initial Calibration Check Standard (ICCS) is to be evaluated as the IPC solution in order to confirm proper

instrument performance. As specified in Section 10.3.1, this must be done using the lowest calibration standard or the standard level established as the MRL. This analysis confirms the MRL and demonstrates proper chromatographic performance at the beginning of each analysis batch. Chromatographic performance is judged by calculating the Peak Gaussian Factor (PGF), which is a means to measure peak symmetry and monitoring retention time drift in the surrogate peak over time. If these criteria are not met, corrective action must be performed prior to analyzing additional samples. Major maintenance like replacing columns require rerunning the IDC (Section 9.2).

9.3.3.1 Critically evaluate the surrogate peak in the initial calibration check standard, and calculate the PGF as follows:

$$PGF = \frac{1.83 \times W(\frac{1}{2})}{W(\frac{1}{10})}$$

where, $W(\frac{1}{2})$ is the peak width at half height, and
$W(\frac{1}{10})$ is the peak width at tenth height.

NOTE: Values for $W(\frac{1}{2})$ and $W(\frac{1}{10})$ can be attained through most data acquisition software.

9.3.3.2 Small variations in retention time can be anticipated when a new solution of eluent is prepared but if sudden shifts of more than 5% are observed in the surrogate retention time, some type of instrument problem is present. Potential problems include improperly prepared eluent, erroneous method parameters programmed such as flow rate or some other system problem. The chromatographic profile (elution order) of the target anions following an ion chromatographic analysis should closely replicate the profile displayed in the test chromatogram that was shipped when the column was purchased. As a column ages, it is normal to see a gradual shift and shortening of retention times, but if after several years of use, extensive use over less than a year, or use with harsh samples, this retention time has noticeably shifted to any less than 80% of the original recorded value, the column requires cleaning or replacement; especially if resolution problems are beginning to become common between previously resolved peaks. A laboratory should retain a historic record of retention times for the surrogate and all the target anions to provide evidence of an analytical columns vitality.

9.3.3.3 If a laboratory chooses to monitor exclusively for trace bromate using PCR and the UV/VIS absorbance detector, and no other analytes are being monitored on the conductivity detector, the surrogate may be omitted from the procedure. In this case, no measurement of PGF is required. However, the laboratory must carefully monitor the bromate retention time in the ICCS as an alternate to the surrogate retention time and, in the same manner, adhere to those specifications set forth in Section 9.3.3.2. During the course of the analysis, bromate retention times in the CCCS and ECCS must also be closely monitored to be certain they adhere to the QC requirements set forth in Section 10.3.2.2.

9.4 ASSESSING ANALYTE RECOVERY AND DATA QUALITY

9.4.1 Laboratory Fortified Sample Matrix (LFM) – The laboratory must add a known amount of each target analyte to a minimum of 5% of the collected field samples or at least one with every analysis batch, whichever is greater. Additional LFM requirements, as described in Section 9.4.1.5, apply when the PCR system is used for low level bromate in chlorine dioxide disinfected waters. For a LFM to be valid, the target analyte concentrations must be greater than the native level and must adhere to the requirement outlined in Section 9.4.1.2. It is recommended that the solutions used to fortify the LFM be prepared from the same stocks used to prepare the calibration standards and not from external source stocks. This will remove the bias contributed by an externally prepared stock and focus on any potential bias introduced by the field sample matrix.

9.4.1.1 The fortified concentration must be equal to or greater than the native concentration. Fortified samples that exceed the calibration range must be diluted to be within the linear range. In the event that the fortified level is less than the observed native level of the unfortified matrix, the recovery should not be calculated. This is due to the difficulty in calculating accurate recoveries of the fortified concentration when the native sample concentration to fortified concentration ratio is greater than one.

9.4.1.2 The LFM should be prepared at concentrations no greater than ten times the highest concentration observed in any field sample and should be varied to reflect the range of concentrations observed in field samples. If no analytes are observed in any field sample, the LFM should be fortified near the MRL.

9.4.1.3 Calculate the percent recovery for each target analyte, corrected for concentrations measured in the unfortified sample. Percent recovery should be calculated using the following equation:

$$\%REC = \frac{(C_s - C)}{s} \times 100$$

where, %REC = percent recovery,
C_s = fortified sample concentration,
C = native sample concentration, and
s = concentration equivalent of analyte added to sample.

9.4.1.4 Recoveries may exhibit a matrix dependence. If the recovery of any analyte falls outside 75 - 125%, and the laboratory's performance for all other QC performance criteria are acceptable, the accuracy problem encountered with the fortified sample is judged to be matrix related, not system related. The result for that analyte in the unfortified sample and the LFM must be labeled suspect/matrix to inform the data user that the result is suspect due to matrix effects. Repeated failure to meet suggested recovery criteria indicates potential problems with the procedure and should be investigated.

9.4.1.5 When the PCR method is used for low level bromate analysis on field samples from PWSs which employ chlorine dioxide disinfection and consequently contain chlorite, a LFM must be prepared, exclusively for trace bromate, for each of these field samples. Initially, the field sample is analyzed and chlorite, chlorate and bromide levels are determined. Then, a second aliquot of field sample is pretreated to remove chlorite, as described in Section 11.1.4, and analyzed to determine native bromate concentration. A third aliquot of the field sample then must be fortified with bromate, pretreated as described in Section 11.1.4 to remove chlorite, and analyzed to assess bromate recovery from that matrix. This additional QC is required to rule out matrix effects and to confirm that the laboratory performed the chlorite removal step (Section 11.1.4.1) appropriately. This LFM should be fortified with bromate at concentrations close to but greater than the level determined in the native sample. Recoveries are determined as described above (Section 9.4.1.3). Samples that fail the LFM percent recovery criteria of 75 - 125% must be reported as suspect/matrix.

9.4.2 SURROGATE RECOVERY – The surrogate is specific to the conductivity detector and shows no response on the postcolumn absorbance detector.

Calculate the surrogate recovery for the conductivity detector from all analyses using the following formula:

$$\%REC = \frac{SRC}{SFC} \times 100$$

where, %REC = percent recovery,
SRC = surrogate recovered concentration, and
SFC = surrogate fortified concentration.

9.4.2.1 Surrogate recoveries must fall between 90-115% for proper instrument performance and analyst technique to be verified. The recovery range for the surrogate is extended to 115% to allow for the potential contribution of trace levels of dichloroacetate as a halogenated organic disinfection by-product (DBP) of dichloroacetic acid (DCAA). Background levels of this organic DBP are rarely observed above 50 µg/L (0.05 mg/L) which constitutes only 5% of the 1.00 mg/L recommended fortified concentration.

9.4.2.2 If the surrogate recovery falls outside the 90-115% recovery window, an analysis error is evident and sample reanalysis is required. Poor recoveries could be the result of imprecise sample injection or analyst fortification errors. If the second analysis also fails the recovery criterion, report all data for that sample as suspect.

9.4.2.3 If a laboratory chooses to monitor exclusively for trace bromate using PCR and the UV/VIS absorbance detector, and no other analytes are being monitored on the conductivity detector, the surrogate may be omitted from the procedure. In this situation, the laboratory MUST adopt the QC protocol outlined in Section 9.3.3.3.

9.4.3 FIELD OR LABORATORY DUPLICATES – The laboratory must analyze either a field or a laboratory duplicate for a minimum of 5% of the collected field samples or at least one with every analysis batch, whichever is greater. The sample matrix selected for this duplicate analysis must contain measurable concentrations of the target anions in order to establish the precision of the analysis set and insure the quality of the data. If none of the samples within an analysis batch have measurable concentrations, the LFM should be repeated as a laboratory duplicate.

9.4.3.1 Calculate the relative percent difference (RPD) from the mean using the following formula:

$$RPD = \frac{(I_C - D_C)}{([I_C + D_C]/2)} \times 100$$

where, RPD = relative percent difference
I_C = the initial quantitated concentration, and
D_C = the duplicate quantitated concentration

9.4.3.2 Duplicate analysis acceptance criteria.

Concentration range	RPD Limits
MRL to 5 x MRL	± 20 %
5 x MRL to highest calibration level	± 10 %

9.4.3.3 If the RPD for any target analyte falls outside the acceptance criteria (Section 9.4.3.2) and if all other QC performance criteria are met for that analyte, the result for the sample and duplicate should be labeled as suspect/matrix to inform the data user that the result is suspect due to a potential matrix effect, which led to poor precision. This should not be a chronic problem and if it frequently recurs (>20% of duplicate analyses), it indicates a problem with the instrument or analyst technique that must be corrected.

9.4.4 In recognition of the rapid advances occurring in chromatography, the analyst is permitted certain options, such as the use of different columns, injection volumes, and/or eluents, to improve the separations or lower the cost of measurements. Each time such modifications to the method are made, the analyst is required to repeat the procedure in Section 9.2 and adhere to the condition of conductivity baseline stability found in Section 1.2.1.

9.4.5 It is recommended that the laboratory adopt additional quality assurance (QA) practices for use with this method. The specific practices that are most productive depend upon the needs of the laboratory and the nature of the samples. Whenever possible, the laboratory should perform analysis of quality control check standards and participate in relevant proficiency testing (PT) or performance evaluation (PE) sample studies.

10. CALIBRATION AND STANDARDIZATION

10.1 Demonstration and documentation of acceptable initial calibration is required prior to the IDC and before any samples are analyzed, is required intermittently throughout sample analysis to meet required QC performance criteria outlined in this method and is summarized in Tables 4 and 5. Initial calibration verification is performed using a QCS as well as with each analysis batch using an initial, continuing (when more than 10 field

samples are analyzed), and end calibration standards. The procedures for establishing the initial calibration curve are described in Section 10.2. The procedures to verify the calibration with each analysis batch is described in Section 10.3.

10.2 INITIAL CALIBRATION CURVE

10.2.1 Establish ion chromatographic operating parameters equivalent to those indicated in Table 1 and configured as shown in Figure 1.

10.2.2 Estimate the Linear Calibration Range – The linear concentration range is the concentration range over which the instrument response is linear. On the conductivity detector for the four target analytes (chlorite, bromate, bromide and chlorate) the linear range should cover the expected concentration range of the field samples and should not extend over more than two orders of magnitude in concentration. The restriction of two orders of magnitude is prescribed since beyond this it is difficult to maintain linearity throughout the entire calibration range.

10.2.2.1 If quantification is desired over a larger range, then two separate calibration curves must be prepared.

10.2.2.2 For an individual calibration curve, a minimum of three calibration standards are required for a curve that extends over a single order of magnitude and a minimum of five calibration standards are required if the curve covers two orders of magnitude. Because high concentrations of chlorite can interfere with the postcolumn analysis of low levels of bromate, the conductivity and absorbance detectors must be calibrated separately.

10.2.2.3 Since the concentration ranges in actual field samples by conductivity detection for chlorite, bromide and chlorate are expected to cover two orders of magnitude, the use of at least five calibration standards in the range 5 - 500 µg/L is recommended. Bromate concentrations are expected to be significantly lower. It is suggested that the conductivity detector be calibrated using at least five bromate calibration standard levels in the range 5 - 100 µg/L. Additionally, report values for bromate by conductivity ONLY when they are measured by the PCR above 15.0 ug/L. The conductivity detector will observe a response for bromate at concentration below 15.0 ug/L but concentrations between 5.0 and 15.0 ug/L are within the calibrated range for PCR detection and will reflect far better precision and accuracy.

10.2.2.4 Although the bromate calibration curve for the absorbance detector

extends over less than two orders of magnitude, the use of five calibration standards, containing only bromate in the range 0.5 - 15.0 µg/L, is recommended.

10.2.3 Prepare the calibration standards by carefully adding measured volumes of one or more stock standards (Section 7.3) to a volumetric flask and diluting to volume with reagent water. Prior to using mixed standards for calibration, it must be ensured that the individual calibration standards do not contain any appreciable concentrations of the other target analytes.

10.2.3.1 EDA must be added to the calibration standards at 50 mg/L. The addition of EDA to all reagent water prepared calibration and quality control samples is required not as a preservative but rather as a means to normalize any bias contributed by the addition of EDA to preserve the field samples.

10.2.3.2 Prepare a 10.0 mL aliquot of surrogate fortified calibration solution which can be held for direct manual injection or used to fill an autosampler vial. This is done by adding 20 µL of the surrogate solution (Section 7.5) to a 20 mL disposable plastic micro beaker. Next, transfer 10.0 mL of calibration standard into the micro beaker and mix. These volumes may be adjusted to meet specific laboratory autosampler volume requirements provided the fortified surrogate concentration is at the prescribed concentration of 1.0 mg/L. The calibration standard is now ready for analysis. The same surrogate solution that has been employed for the standards should also be used in Section 11.1 for the field samples.

NOTE: This surrogate fortification procedure may be omitted if a laboratory chooses to monitor exclusively for trace bromate using PCR and the UV/VIS absorbance detector, and no other analytes are being monitored on the conductivity detector. In this situation, the laboratory must adopt the QC protocol outlined in Section 9.3.3.3.

10.2.4 Inject 225 µL of each calibration standard. Increased sensitivity for low level detection of bromate by PCR can be achieved by increasing the injected sample volume.[4] If the injection volume is increased special operating conditions must be used to insure proper chromatographic performance.[4]

10.2.5 Tabulate peak area responses against the concentration for the four target analytes, the surrogate from the conductivity detector and bromate from the postcolumn absorbance detector. The results are used to prepare calibration curves using linear regression analysis for each analyte on the conductivity detector and using a quadratic regression analysis for bromate on the absorbance

detector.

10.2.5.1 Use of peak areas are strongly recommended since they have been found to be more consistent, in terms of quantitation, than peak heights. Peak height can tend to be suppressed as a result of high levels of common anions in a given matrix which can compete for exchange sites leading to peak broadening. Using peak areas, it is the analyst responsibility to review all chromatograms to insure accurate baseline integration of target analyte peaks, since poorly drawn baselines will more significantly influence peak areas than peak heights.

10.2.6 After establishing or reestablishing calibration curves, the accuracy of this calibration must be verified through the analysis of a QCS or an externally prepared second source standard. The QCS should be prepared at a concentration near the middle of the calibration and is best to be analyzed in triplicate. As specified in Section 9.2.5, determined concentrations must fall within ± 15% of the stated values.

10.3 CONTINUING CALIBRATION VERIFICATION – Initial calibrations may be stable for extended periods of time. Once the calibration curves have been established for both the conductivity and absorbance detectors, they must be verified for each analysis batch, prior to conducting any field sample analyses using an Initial Calibration Check Standard. Continuing Calibration Check Standards and End Calibration Check Standards are also required as described in the sections below.

10.3.1 INITIAL CALIBRATION CHECK STANDARD (ICCS) – The initial calibration must be determined to be valid each day prior to analyzing any samples. Since two detectors are incorporated in this method, this must be accomplished by using a mixed calibration check standard for the four conductivity analytes and a separate low level bromate initial calibration check standard for the absorbance detector. In both cases, the lowest level standard used to prepare the calibration curve must be used. In cases where the analyst has chosen to set the MRL above the lowest standard, a standard at a concentration equal to or below the MRL is acceptable. Percent recovery for the ICCS must be in the range or 75 - 125% before the analyst is allowed to analyze samples.

10.3.2 CONTINUING CALIBRATION CHECK/END CALIBRATION CHECK STANDARDS (CCCS/ECCS) – Continuing calibration check standards must be analyzed after every tenth field sample analysis and at the end of the analysis batch as an end calibration check standard. For the reasons noted above, two separate continuing and end calibration check standards must be incorporated. If more than 10 field samples are included in an analysis batch, the analyst must

alternate between the middle and high continuing calibration check standard levels.

10.3.2.1 The percent recovery for the CCCS/ECCS must meet the following criteria:

	Concentration range	Percent Recovery Limits
_____	MRL to 5 x MRL	75 - 125 %
_____	5 x MRL to highest calibration level	85 - 115 %

10.3.2.2 If during the analysis batch, the measured concentration on either detector differs by more than the calibration verification criteria shown above, or the retention times shift more than ± 2% from the last acceptable initial or continuing calibration check standard for any analyte, all samples analyzed after the last acceptable calibration check standard are considered invalid and must be reanalyzed. The source of the problem must be identified and resolved before reanalyzing the samples or continuing with the analyses.

10.3.2.3 In the case where the end calibration failed to meet performance criteria, but the initial and middle calibration check standards were acceptable, the samples bracketed by the acceptable calibration check standards may be reported. However, all field samples between the middle and end calibration check standards must be reanalyzed.

11. PROCEDURE

11.1 SAMPLE PREPARATION

11.1.1 For refrigerated or field samples arriving to the laboratory cold, ensure the samples have come to room temperature prior to conducting sample analysis by allowing the samples to warm on the bench for at least 1 hour.

11.1.2 Prepare a 10.0 mL aliquot of surrogate fortified sample which can be held for direct manual injection or used to fill an autosampler vial. This is done by adding 20 µL of the surrogate solution (Section 7.5) to a 20 mL disposable plastic micro beaker. Next, place a 10.0 mL aliquot of sample into the micro beaker and mix. These volumes may be adjusted to meet specific laboratory autosampler volume requirements provided the fortified surrogate concentration is at the prescribed concentration of 1.0 mg/L. The sample is now ready for analysis.

NOTE: The less than 1% dilution error introduced by the addition of the

surrogate is considered insignificant. In addition, this surrogate fortification procedure may be omitted if a laboratory chooses to monitor exclusively for trace bromate using PCR and the UV/VIS absorbance detector, and no other analytes are being monitored on the conductivity detector. In this situation, the laboratory must adopt the QC protocol outlined in Section 9.3.3.3.

11.1.3 Using a Luer lock, plastic 10 mL syringe, withdraw the sample from the micro beaker and attach a 0.45 µm particulate filter (demonstrated to be free of ionic contaminants) directly to the syringe. Filter the sample into an autosampler vial (if vial is not designed to automatically filter) or manually load the injection loop injecting a fixed amount of filtered, well mixed sample. If using a manually loaded injection loop, flush the loop thoroughly between sample analysis using sufficient volumes of each new sample matrix.

11.1.4 CHLORINE DIOXIDE - TREATED WATERS CONTAINING CHLORITE – Treatment plants that use chlorine dioxide as part of their treatment process can produce high levels of chlorite in samples. Since chlorite can interfere with the postcolumn quantitation of low levels of bromate as described in Section 4.6, chlorite must be removed from these samples prior to analysis.[12] The oxidation-reduction reaction between ferrous iron and chlorite[13] is used to remove chlorite without any adverse affects on the bromate concentration.[14] The EDA stabilized sample is acidified to a pH of 5-6 (verified using pH test strips), ferrous iron solution is added and allowed to react for 10 minutes. The sample is then filtered using a 0.45 micron membrane to remove precipitated ferric hydroxide and the excess soluble iron is removed by passing the filtered sample through a hydrogen cartridge [a solid phase extraction (SPE) clean-up cartridge in the H+ form, (Section 6.11)], prior to analysis. Prior to using any pretreatment, each lot of cartridges must be QC checked to insure proper analyte recoveries are maintained and laboratory reagent blanks are free from interferences. In addition, consistent lots of reagents, pretreatment cartridges, and membrane cartridges must be used throughout an entire analysis batch to maintain assured QC uniformity.

11.1.4.1 Place a 10 mL aliquot of sample in a 20 mL micro beaker and add 35 uL of 0.5 N sulfuric acid (Section 7.8). After mixing, verify the pH is between 5 and 6 using pH test strips, add 40 uL of ferrous iron solution (Section 7.7), mix and allow to react for 10 minutes. Filter the reaction mixture using a 0.45 micron particulate filter (Section 6.10) attached to a 10 mL syringe into the barrel of a second syringe to which a pre-conditioned hydrogen cartridge (Section 6.11) is attached. Pass the solution through a hydrogen cartridge at a flow rate of approximately 2 mL per minute. Discard the first 3 mL, and collect an appropriate volume (depending on autosampler vial size) for analysis.

Add the respective volume of surrogate solution, depending on the volume collected, and the sample is ready for analysis.

NOTE: Pretreated samples can be held for no more than 30 hours after initial pretreatment. If this time has expired, the pretreatment steps must be repeated on a second aliquot of both the field sample matrix and the respective LFM.

11.1.4.2 In order to ensure data quality, all samples from PWSs which utilize chlorine dioxide which have been pretreated to remove chlorite, MUST also be used to prepare a pretreated LFM specific to trace bromate. This LFM should be fortified with bromate at concentrations close to but greater than the level determined in the native sample. Initially, the field sample is analyzed and chlorite, chlorate and bromide levels are determined. Then, a second aliquot of field sample is pretreated to remove chlorite, as described above and analyzed to determine native bromate concentrations. A third aliquot of the field sample then must be fortified with bromate, pretreated to remove chlorite, and analyzed to assess bromate recovery from that matrix. This additional QC is required to rule out matrix effects and to confirm that the laboratory performed the chlorite removal step appropriately. If the bromate recovery falls outside the acceptance range of 75 - 125% (Section 9.4.1.5), that particular sample should be reported as suspect/matrix.

11.1.4.3 Suppressor devices which have had long term exposure to iron cations may have reduced method performance in other applications, such as the determination of certain common inorganic anions. If reduced peak response is observed, particularly for fluoride or phosphate, the ASRS should be cleaned according to the manufacturer's recommendations.

11.2 SAMPLE ANALYSIS

11.2.1 Table 1 summarizes the recommended operating conditions for the ion chromatograph and delivery of the postcolumn reagent. Included in this table is estimated retention times that can be achieved by this method. Other columns or chromatographic conditions may be used if the requirements of Section 9.2 are met.

11.2.2 Establish a valid initial calibration as described in Section 10.2 and complete the IDC (Section 9.2). Check system calibration by analyzing an ICCS (Section 10.3.1) as part of the initial QC for the analysis batch and, if required, recalibrate as described in Section 10.3.

11.2.3 Inject 225 µL of each sample. Use the same size loop for standards and samples. An automated constant volume injection system may also be used.

11.2.3.1 Increased sensitivity for low level detection of bromate by PCR can be achieved by increasing the injected sample volume.[4] If the injection volume is increased (Section 10.2.4) special operating conditions must be used to insure proper chromatographic performance.[3]

11.2.4 The width of the retention time window used to make identifications should be based upon measurements of actual retention time variations of standards measured over several days. Three times the standard deviation of retention time can be used to calculate a suggested window size for each analyte. However, the experience of the analyst should weigh heavily in the interpretation of chromatograms.

11.2.5 If the response of a sample analyte exceeds the calibration range, the sample must be diluted with an appropriate amount of EDA fortified reagent water and reanalyzed. If this is not possible then three new calibration concentrations must be employed to create a separate high concentration calibration curve, one standard near the estimated concentration and the other two bracketing around an interval equivalent to approximately ± 25% the estimated concentration. The latter procedure involves significantly more time than a simple sample dilution and, therefore, it is advisable to collect sufficient sample to allow for sample dilution and sample reanalysis, if required.

11.2.6 Should more complete resolution be needed between any two coeluting peaks, the eluent (Section 7.2) can be diluted. This will spread out the run, however, and will cause late eluting anions to be retained even longer. The analyst must verify that this dilution does not negatively affect performance by repeating and passing all the QC criteria in Section 9, and by reestablishing a valid initial calibration curve (Section 10.2). As a specific precaution, upon dilution of the carbonate eluent, a peak for bicarbonate may be observed by conductivity within the retention time window for bromate which will negatively impact the analysis.

11.2.6.1 Eluent dilution will reduce the overall response of an anion due to chromatographic band broadening which will be evident by shortened and broadened peaks. This will adversely effect the MDLs for each analyte.

11.3 AUTOMATED ANALYSIS WITH METHOD 317.0

11.3.1 Laboratories conducting analyses on large numbers of samples often prepare

large analysis batches that are run in an automated manner. When conducting automated analyses, careful attention must be paid to all reservoirs to be certain sufficient volumes are available to sustain extended operation. Laboratories must ensure that all QC performance criteria are met as described in preceding sections to ensure their data are of acceptable quality.

11.3.1.1 Special attention must be made when the PCR reservoir is refilled. Since this is a pneumatically driven system, the baseline will require a minimum of ten minutes to restabilize after the reservoir has been refilled and the bottle repressurized.

11.3.2 Because this method has two detectors that require independent calibration, analysis sequences must be carefully constructed to meet required QC specifications and frequency (Table 5). To help with this task, an acceptable sequence for a sample analysis batch, with all the method-required QC, is shown in Table 6. This schedule is included only as an example of a hypothetical analysis batch where the analyst desires to collect data using both detectors. Within the analysis batch, references to exact concentrations for the ICCS, CCCS and ECCS are for illustrative purposes only. The analyses for sample #14 provides an example of the QC requirements for a complete conductivity and trace bromate PCR analysis of a sample from a PWS employing chlorine dioxide disinfection.

11.3.3 Table 6 may be used as a guide when preparing analysis batches.

12. DATA ANALYSIS AND CALCULATIONS

12.1 Identify the method analytes in the sample chromatogram by comparing the retention time of the suspected analyte peak to the retention time of a known analyte peak in a calibration standard. If analyte retention times have shifted (generally towards shorter times) since the initial calibration, but are still within acceptance criteria and are reproducible during the analysis batch, the analyst should use the retention time in the daily calibrations to confirm the presence or absence of target analytes.

12.2 Compute sample concentration using the initial calibration curve generated in Section 10.2.

12.3 Report ONLY those values that fall between the MRL and the highest calibration standards. Samples with target analyte responses exceeding the highest standard must be diluted and reanalyzed. When this is not possible the alternate calibration procedures described in Section 11.2.5 must be followed. Samples with target analytes identified but quantitated below the concentration established by the lowest calibration standard may be reported as present, but below the minimum reporting limit (MRL), and consequently not quantitated.

12.3.1 Report bromate concentrations using the postcolumn UV/VIS absorbance detector when they fall between the MRL and 15.0 ug/L. When bromate concentrations exceed 15.0 ug/L, as detected by UV/VIS absorbance, either report by conductivity, calibrate the postcolumn UV/VIS absorbance detector to a higher bromate concentration, or dilute the sample.

12.4 Report results in µg/L.

12.5 Software filtering of the postcolumn UV/VIS absorbance signal is required to improve the precision of peak measurements, minimize non-random noise and improve peak appearance. Olympic smoothing (25 points, 5 seconds with 1 iteration) was chosen using peak area for quantitation because it was determined to have minimal effect on peak height and/or area.[2-15] The use of alternate smoothing routines is acceptable providing all QC criteria are met.

13. METHOD PERFORMANCE

13.1 Table 1 gives the standard conditions, typical retention times and single laboratory MDLs in reagent water, as determined for each of the inorganic oxyhalide DBPs and bromide. Included in this table is a comparison of the MDLs determined by conductivity both with and without the postcolumn UV/VIS absorbance system on-line. These data indicate that the postcolumn UV/VIS detector system has no effect on conductivity detector performance (careful attention must however be paid to insure backpressure on the suppressor is kept below 120 psi).

13.2 Table 2 shows the precision and accuracy of the trace bromate measurement, evaluated on both detectors, at two fortified concentrations, in chlorinated surface water, a simulated high ionic strength water (HIW) and a simulated high organic (HOW) content water. The mean bromate recovered concentration (accuracy relative to the fortified level) and the precision (expressed as %RSD of the replicate analyses) are tabulated. The HIW was designed to simulate a high ionic strength field sample and the HOW designed to simulate a high organic content field sample. The HIW was prepared from reagent water which was fortified with the common anions of chloride at 100 mg/L, carbonate at 100 mg/L, nitrate at 10.0 mg/L as nitrogen, phosphate at 10.0 mg/L as phosphorous, and sulfate at 100 mg/L.[1] The HOW was prepared from reagent water fortified with 1.0 mg/L fulvic acid.[1]

13.3 Table 3 gives the single laboratory standard deviation and precision (% RSD) for each anion included in the method in a variety of waters for the standard conditions identified in Table 1.[1-2]

13.4 Table 3A shows the stability data for the inorganic oxyhalide DBPs. Each data point in these tables represent the mean percent recovery following triplicate analyses. These

data were used to formulate the holding times shown in Section 8.3.[1]

14. POLLUTION PREVENTION

14.1 Pollution prevention encompasses any technique that reduces or eliminates the quantity or toxicity of waste at the point of generation. Numerous opportunities for pollution prevention exist in laboratory operation. The EPA has established a preferred hierarchy of environmental management techniques that places pollution prevention as the management option of first choice. Whenever feasible, laboratory personnel should use pollution prevention techniques to address their waste generation. When wastes cannot be feasiblely reduced at the source, the Agency recommends recycling as the next best option.

14.2 Quantity of the chemicals purchased should be based on expected usage during its shelf-life and disposal cost of unused material. Actual reagent preparation volumes should reflect anticipated usage and reagent stability.

14.3 For information about pollution prevention that may be applicable to laboratories and research institutions, consult "Less is Better: Laboratory Chemical Management for Waste Reduction," available from the American Chemical Society's Department of Government Regulations and Science Policy, 1155 16th Street N.W., Washington D.C. 20036, (202) 872-4477.

15. WASTE MANAGEMENT

15.1 The Environmental Protection Agency requires that laboratory waste management practices be conducted consistent with all applicable rules and regulations. Excess reagents, samples and method process wastes should be characterized and disposed of in an acceptable manner. The Agency urges laboratories to protect the air, water, and land by minimizing and controlling all releases from hoods and bench operations, complying with the letter and spirit of any waste discharge permit and regulations, and by complying with all solid and hazardous waste regulations, particularly the hazardous waste identification rules and land disposal restrictions. For further information on waste management consult the "Waste Management Manual for Laboratory Personnel," available from the American Chemical Society at the address listed in Section 14.3.

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17. TABLES, DIAGRAMS, FLOWCHARTS AND VALIDATION DATA

TABLE 1. CHROMATOGRAPHIC CONDITIONS AND METHOD DETECTION LIMITS IN REAGENT WATER FOR THE INORGANIC OXYHALIDE DISINFECTION BY-PRODUCTS AND BROMIDE.

Standard Conditions and Equipment[a]:

Ion Chromatograph:	Dionex DX500
Sample Loop:	225 µL
Eluent:	9.0 mM Na_2CO_3
Eluent Flow:	1.3 mL/min
Columns :	Dionex AG9-HC / AS9-HC, 4 mm
Typical System Backpressure:	2300 psi
Suppressor:	ASRS-I, external water mode, 100 mA current
Detectors:	Suppressed Conductivity Detector, Dionex CD20 Background Conductivity: 24 µS Absorbance Detector, Dionex AD20 (10 mm cell path) Set for absorbance at 450 nm (Tungsten lamp)
Postcolumn Reagent Flow:	0.7 mL/min
Postcolumn Reactor Coil: knitted, potted for heater, 500 uL internal volume	
Postcolumn Heater:	80 °C
Recommended method total analysis time:	25 minutes

Analyte Retention Times and Method Detection Limits (MDLs):

		MDL DETERMINATION		
Analyte	Retention Time [b] (min.)	Fortified Conc. (µg/L)	# of Reps.	MDL (µg/L)
Chlorite[c]	4.20	2.0	8	0.45
Chlorite[d]	4.20	2.0	8	0.89
Bromate[c]	4.85	2.0	8	0.98
Bromate[d]	4.85	2.0	8	0.71
Bromate[e]	5.35	0.50	7	0.12
Surrogate: DCA[c,d]	8.50			
Bromide[c]	10.0	2.0	8	0.54
Bromide[d]	10.0	2.0	8	0.69
Chlorate[c]	11.0	2.0	8	0.92
Chlorate[d]	11.0	2.0	8	0.62

(a) Mention of trade names or commercial products does not constitute endorsement or recommendation for use.
(b) Reference to chromatograms in Figure 2 and 3.
(c) Method 317.0 conductivity detection without PCR online.
(d) Method 317.0 conductivity detection with PCR online.
(e) Method 317.0 ONLY bromate by postcolumn UV/VIS absorbance detection.

TABLE 2. SINGLE LABORATORY PRECISION IN VARIOUS MATRICES FOR BROMATE BY CONDUCTIVITY AND ABSORBANCE DETECTION.

		PRECISION				
Matrix	Detection	Fortified Conc. (µg/L)	# of Reps.	Mean (µg/L)	SD (n-1)	% RSD
Reagent Water	Conductivity	0.50	8	< MRL[a]		< MRL
	Conductivity	5.0	8	4.8	0.420	8.83
	Absorbance	0.50	8	0.50	0.054	10.8
	Absorbance	5.0	8	5.4	0.110	2.10
Chlorinated Drinking Water	Conductivity	0.50	8	< MRL		< MRL
	Conductivity	5.0	7[b]	4.1	0.650	15.7
	Absorbance	0.50	8	0.53	0.050	2.77
	Absorbance	5.0	8	5.2	0.098	1.87
High Ionic Water	Conductivity	0.50	8	< MRL		< MRL
	Conductivity	5.0	8	4.5	0.960	21.4
	Absorbance	0.50	8	0.52	0.430	8.20
	Absorbance	5.0	8	5.1	0.199	3.90
High Organic Water	Conductivity	0.50	8	< MRL		< MRL
	Conductivity	5.0	8	5.1	0.199	3.90
	Absorbance	0.50	8	0.50	0.044	8.81
	Absorbance	5.0	8	5.2	0.014	2.61

[a] <MRL = analyte was not detected at or above the minimum reporting level.
[b] n = 8 one outlier reject using Dixon's Outlier Test.[16]

Standard Conditions: Same as listed in Table 1.

TABLE 3. SINGLE-LABORATORY PRECISION AND RECOVERY FOR THE INORGANIC DISINFECTION BY-PRODUCTS AND BROMIDE.[1,2]

Analyte	Matrix	Unfortified Conc. (µg/L)	Fortified Conc. (µg/L)	# of Reps.	Mean (µg/L)	Mean %REC	SD(n-1)	%RSD
Chlorite	RW	<MRL[a]	100	9	96.2	96.2	0.95	0.99
			500	9	520	105	3.13	0.60
	HIW	<MRL	100	9	102	102	2.19	2.15
			500	9	520	104	3.64	0.70
	SW	<MRL	100	9	91.4	91.4	1.22	1.33
			500	9	500	99.0	7.54	1.52
	GW	<MRL	100	9	92.9	92.9	1.65	1.77
			500	9	490	98.1	3.40	0.69
	ClW	<MRL	100	9	87.4	87.4	0.59	0.68
			500	9	490	97.1	6.36	1.31
	CDW	292	100	9	400	NC[b]	1.64	0.41
			500	9	810	104	4.00	0.49
	O3W	<MRL	100	9	84.4	84.4	0.46	0.54
			500	9	480	96.1	3.24	0.67
Bromate by Conductivity	RW	<MRL	5.0	9	5.05	101	0.45	8.86
			25	9	26.5	106	1.71	6.47
	HIW	<MRL	5.0	9	4.88	97.5	0.95	19.5
			25	9	25.5	102	1.37	5.37
	SW	<MRL	5.0	9	4.46	89.2	0.58	13.0
			25	9	26.3	105	1.10	4.18
	GW	<MRL	5.0	9	5.10	102	0.50	9.75
			25	9	22.2	88.9	1.29	5.81
	ClW	<MRL	5.0	9	4.63	92.6	0.77	16.7
			25	9	25.0	100.	1.64	6.55
	CDW	<MRL	5.0	9	4.14	82.7	0.62	15.1
			25	9	25.3	101	1.28	5.09
	O3W	1.45	5.0	9	5.50	80.9	0.61	11.1
			25	9	24.1	90.6	1.13	4.69

RW = Reagent Water
HIW = High Ionic Strength Water
SW = Surface Water
GW = Groundwater
ClW = Chlorinated Drinking Water
CDW = Chlorine Dioxide Treated Drinking Water
O3W = Ozonated Drinking Water

[a] <MRL = analyte was not detected at or above the minimum reporting level.
[b] NC = Not calculated since amount fortified was less than unfortified native matrix concentration (Section 9.4.1.1.).

TABLE 3. SINGLE-LABORATORY PRECISION AND RECOVERY FOR THE INORGANIC DISINFECTION BY-PRODUCTS AND BROMIDE (cont.).[1,2]

Analyte	Matrix	Unfortified Conc. (µg/L)	Fortified Conc. (µg/L)	# of Reps.	Mean (µg/L)	Mean %REC	SD(n-1)	%RSD
Bromide	RW	<MRL[a]	20.0	9	20.8	104	0.80	3.82
			100	9	110	107	0.60	0.56
	HIW	3.2	20.0	9	21.7	92.5	0.79	3.63
			100	9	110	102	1.05	1.00
	SW	31	20.0	9	51.0	NC[b]	0.97	1.90
			100	9	140	109	1.88	1.35
	GW	150	20.0	9	170	NC	0.78	0.45
			100	9	260	NC	218	0.82
	ClW	16	20.0	9	39.0	115	0.64	1.62
			100	9	130	109	2.00	1.60
	CDW	12	20.0	9	35.0	115	0.76	2.22
			100	9	130	113	1.24	0.99
	O3W	40.	20.0	9	65.0	NC	3.67	5.61
			100	9	150	113	1.00	0.65
Chlorate	RW	<MRL	100	9	98.3	98.3	0.80	0.82
			500	9	520	104	4.15	0.80
	HIW	<MRL	100	9	86.1	86.1	1.47	1.70
			500	9	500	100.	4.52	0.90
	SW	3.2	100	9	100	98.3	1.57	1.55
			500	9	510	102	7.11	1.39
	GW	<MRL	100	9	93.5	93.5	2.00	2.14
			500	9	510	102	3.84	0.75
	ClW	34	100	9	140	102	1.01	0.74
			500	9	550	103	3.11	0.57
	CDW	120	100	9	220	NC	3.20	1.44
			500	9	650	106	3.50	0.54
	O3W	6.2	100	9	110	100.	1.20	1.13
			500	9	520	103	2.45	0.47

RW = Reagent Water
HIW = High Ionic Strength Water
SW = Surface Water
GW = Groundwater
ClW = Chlorinated Drinking Water
CDW = Chlorine Dioxide Treated Drinking Water
O3W = Ozonated Drinking Water

[a] <MRL = analyte was not detected at or above the minimum reporting level.
[b] NC = Not calculated since amount fortified was less than unfortified native matrix concentration (Section 9.4.1.1.).

TABLE 3. SINGLE-LABORATORY PRECISION AND RECOVERY FOR THE INORGANIC DISINFECTION BY-PRODUCTS AND BROMIDE (cont.).[1,2]

Analyte	Matrix	Fortified Conc. (mg/L)	# of Reps.	Mean (mg/L)	Mean %REC	SD(n-1)	%RSD
Surrogate: DCA	RW	5.0	9	5.1	102	0.93	0.91
(see Note)				5.0	99.5	0.69	0.69
	HIW	5.0	9	5.0	100.	0.79	0.79
				5.0	99.2	1.76	1.78
	SW	5.0	9	4.9	98.9	0.70	0.7
				5.0	99.8	1.60	1.61
	GW	5.0	9	5.1	102	0.50	0.49
				5.1	103	0.50	0.49
	ClW	5.0	9	5.2	103	1.73	1.68
				5.1	103	1.12	1.09
	CDW	5.0	9	5.0	100.	1.02	1.02
				5.0	101	1.08	1.07
	O3W	5.0	9	5.0	99.8	0.70	0.7
				5.1	101	0.53	0.52

RW = Reagent Water
HIW = High Ionic Strength Water
SW = Surface Water
GW = Groundwater
ClW = Chlorinated Drinking Water
CDW = Chlorine Dioxide Treated Drinking Water
O3W = Ozonated Drinking Water

NOTE: The surrogate DCA was fortified at 5 mg/L but due to concerns about measuring trace concentrations of bromide with such high concentration of the neighboring surrogate peak, the recommended fortified concentration for the surrogate has been reduced to 1.00 mg/L.

TABLE 3A. STABILITY STUDY RESULTS FOR THE INORGANIC DISINFECTION BY-PRODUCTS AND BROMIDE.[1]

Analyte	Preservative	Matrix	Unfortified Conc. (µg/L)	Fortified Conc. (µg/L)	Analyte % Recovery Day 0	Day 3	Day 10	Day 30	See Note
Chlorite	None	RW	<MRL	500	99.8	100	104	94.3	
		HIW	<MRL	500	99.3	98.5	106	89.3	
		SW	<MRL	500	92.0	88.5	82.3	75.1	(a)
		GW	<MRL	500	93.9	94.5	96.1	91.7	
		CIW	<MRL	500	93.7	NA[(a)]	90.3	84.7	(b,c)
		CDW	290	500	98.6	101	91.7	77.5	(a,c)
		O3W	<MRL	500	10.0	NA	82.5	90.5	(b)
Chlorite	EDA	RW	<MRL	500	101	101	104	95.3	
		HIW	<MRL	500	98.4	98.7	104	95.4	
		SW	<MRL	500	98.3	97.3	97.8	92.7	
		GW	<MRL	500	97.7	97.1	97.5	92.6	
		CIW	<MRL	500	98.9	NA	96.9	92.6	(b)
		CDW	300	500	103	107	102	94.5	
		O3W	<MRL	500	105	NA	96.3	91.9	(b)
Bromate	None	RW	<MRL	25.0	93.6	94.1	110	96.1	
		HIW	<MRL	25.0	100.	86.0	105	87.7	
		SW	<MRL	25.0	98.7	95.1	105	102	
		GW	<MRL	25.0	79.4	92.4	77.8	82.2	
		CIW	<MRL	25.0	102	NA	101	103	(b)
		CDW	<MRL	25.0	104	96.8	98.9	92.1	
		O3W	2.3	25.0	87.3	NA	84.3	99.9	(b)
Bromate	EDA	RW	<MRL	25.0	97.3	95.3	99.5	102	
		HIW	<MRL	25.0	86.9	86.1	107	91.2	
		SW	<MRL	25.0	100.	104	103	94.9	
		GW	<MRL	25.0	83.2	101	88.4	88.3	
		CIW	<MRL	25.0	105	NA	101	102	(b)
		CDW	<MRL	25.0	117	97.3	98.1	83.9	
		O3W	2.3	25.0	92.6	NA	84.5	88.9	(b)

NOTES:
(a) Degradation in the unpreserved matrix is apparent.
(b) NA indicates "NOT ANALYZED"
(c) Analyte recovery will be adversely effected by reactions with free chlorine.

TABLE 3A. STABILITY STUDY RESULTS FOR THE INORGANIC DISINFECTION BY-PRODUCTS AND BROMIDE (cont.).[1,2]

Analyte	Preservative	Matrix	Unfortified Conc. (µg/L)	Fortified Conc. (µg/L)	Analyte % Recovery Day 0	Day 3	Day 10	Day 30	See Note
Bromide	None	RW	<MRL	100	99.4	97.2	107	101	
		HIW	<MRL	100	102	103	105	105	
		SW	31	100	102	97.1	107	99.1	
		GW	150	100	97.7	95.3	109	100.	
		ClW	4.7	100	8.90	NA[(a)]	37.0	11.4	(b,c,d)
		CDW	<MRL	100	5.78	23.1	39.0	51.3	(c,d)
		O3W	30	100	98.3	NA	120	108	(b,d)
Bromide	EDA	RW	<MRL	100	98.4	98.6	107	100.	
		HIW	<MRL	100	104	103	106	105	
		SW	31	100	99.5	98.2	107	100.	
		GW	150	100	100.	97.0	114	97.7	
		ClW	12	100	101	NA	115	97.4	(b,c)
		CDW	6.1	100	101	96.5	119	110	(c)
		O3W	31	100	97.3	NA	122	102	(b)
Chlorate	None	RW	<MRL	500	102	102	105	97.4	
		HIW	<MRL	500	97.0	97.8	101	95.4	
		SW	5.8	500	100.	97.8	100.	96.0	
		GW	<MRL	500	100.	98.7	101	99.8	
		ClW	38	500	102	NA	104	98.2	(b)
		CDW	130	500	102	99.9	104	99.6	
		O3W	8.3	500	100.	NA	103	97.3	(b)
Chlorate	EDA	RW	<MRL	500	104	98.6	103	97.3	
		HIW	<MRL	500	97.0	103	100.	95.0	
		SW	6.7	500	100.	98.2	100.	95.6	
		GW	<MRL	500	102	97.0	101	99.3	
		ClW	38	500	101	NA	102	96.1	(b)
		CDW	120	500	102	96.5	105	97.7	
		O3W	8.6	500	98.0	NA	103	96.4	(b)

NOTES:
(a) Degradation in the unpreserved matrix is apparent.
(b) NA indicates "NOT ANALYZED"
(c) Analyte recovery will be adversely effected by reactions with free chlorine.
(d) Measurement of Br^- is not in the scope (source/raw water only)

TABLE 4. INITIAL DEMONSTRATION OF CAPABILITY QC REQUIREMENTS.

Reference	Requirement	Specification and Frequency	Acceptance Criteria
Sect. 9.2.2 9.3.1	Initial Demonstration of Low System Background	Analyze a method blank (LRB) and determine that all target analytes are below ½ of the proposed MRL prior to performing the IDC	The LRB concentration must be ≤ ½ of the proposed MRL
Sect. 9.2.3	Initial Demonstration of Precision (IDP)	Conductivity: analyze 7 replicate LFBs recommend fortify at 20 ug/L Absorbance: analyze 7 replicate LFBs recommend fortify with bromate at 2.0 ug/L	%RSD must be ≤20%
Sect. 9.2.4	Initial Demonstration of Accuracy (IDA)	Calculate average recovery of IDP replicates	Mean % recovery must be ± 15% of true value.
Sect. 9.2.5	Quality Control Sample (QCS)	Initially and at least quarterly analyze a QCS from an external/second source	QCS must be ± 20% of the true value
Sect. 9.2.6	Method Detection Limit (MDL) Determination	Select a fortifying level at 3-5 times the estimated instrument detection limit at or lower than the MRL. Analyze 7 replicate LFBs Calculate MDL using equation in Section 9.2.6 - do not subtract blank	
Sect. 9.2.7	Minimum Reporting Level (MRL)	MRLs MUST be established for all analytes during the IDC.	The low CAL standard can be lower than the MRL, but the MRL MUST be no lower than the low CAL standard

TABLE 5. QUALITY CONTROL REQUIREMENTS (SUMMARY).

Reference	Requirement	Specification and Frequency	Acceptance Criteria
Sect. 8.3	Sample Holding Time / Preservation	Bromate 28 days, refrig. at <6°C / EDA Preservation Bromide 28 days, EDA Permitted Chlorate 28 days, refrig. at <6°C / EDA Preservation Chlorite 14 days, refrig. at <6°C / EDA Preservation	Holding time and temperature must not be exceeded. EDA added to all samples
Sect. 11.1.4.1 (specific to PCR)	Pretreated Sample (acidified/ Fe [II] added to remove chlorite) Holding Time	ONLY REQUIRED when samples containing chlorite are pretreated and PCR is employed to measure trace bromate in samples. MAXIMUM PRETREATED SAMPLE HOLDING TIME: 30 hours	Pretreated sample holding time must not be exceeded
Sect. 10.2	Initial Calibration	Conductivity: generate calibration curve using at least 5 standards Absorbance: generate calibration curve using at least 5 bromate standards	MRL MUST be no lower than the lowest calibration standard
Sect. 10.3.1	Initial Calibration Check	Daily, verify calibration of conductivity detector at the MRL by analyzing an initial low-level continuing calibration check standard (ICCS) and a separate low-level ICCS for the absorbance detector at the MRL.	Recovery must be 75-125% of the true value on both detectors
Sect. 10.3.2	Continuing Calibration and End Calibration Checks	Alternately analyze separate mid and high level CCCS/ECCS after every 10 samples and after the last sample	MRL to 5 x MRL must have 75 - 125% recovery on both detectors For 5 x MRL to highest CCCS must have 85 - 115% recovery on both detectors
Sect. 9.3.1	Laboratory Reagent Blank (LRB)	Include LRB with every analysis batch (up to 20 samples) Analyze prior to analyzing field samples	All analytes must be ≤ ½ MRL
Sect. 9.3.1.2 (specific to PCR)	PRETREATED Laboratory Reagent Blank (LRB)	REQUIRED in any analysis batch which includes samples which have been pretreated to remove chlorite prior to PCR measurement of trace bromate.	PCR measured bromate < ½ MRL
Sect. 9.3.2	Laboratory Fortified Blank (LFB)	Laboratory must analyze LFB in each analysis batch following the ICCS. Calculate %REC prior to analyzing samples	LFB recovery if fortified at conc. from MRL to 5X MRL must be 75 - 125%. For 5X MRL to highest CCCS must be 85 - 115%. Must have acceptable recoveries prior to analyzing samples. Sample results from batches that fail LFB are invalid

TABLE 5. QUALITY CONTROL REQUIREMENTS (SUMMARY CONTINUED).

Reference	Requirement	Specification and Frequency	Acceptance Criteria
Sect. 9.3.3	Instrument Performance Check (IPC)	Calculate Peak Gaussian Factor (PGF) using equation (Sect. 9.3.3.1) and monitor retention time for surrogate in Initial Calibration Check Standard (ICCS) each day	PGF must fall between 0.80 and 1.15 Ret. Time (RT) for surrogate must remain 80% of initial RT when column was new
Sect. 9.4.1 Sect. 11.1.4.2	Laboratory Fortified Sample Matrix (LFM)	Must add known amount of each target analyte to a minimum of 5% of field samples or at least one within each analysis batch for both detectors LFM must be fortified above the native level and at no greater than 5 x the highest field sample concentration Calculate target analyte recovery using formula (Sect. 9.4.1.3) When field samples from chlorine dioxide plants which contain chlorite are pretreated prior to the PCR measurement of trace bromate, an additional LFM must be prepared for each pretreated field sample (Sect. 9.4.1.5)	Recovery should be 75 - 125% If fortified sample fails the recovery criteria, label both as suspect/matrix.
Sect. 9.4.2	Surrogate	Dichloroacetate is added to all blanks, samples and standards (if measuring by conductivity and absorbance) Calculate recovery using formula in Section 9.4.2	Surrogate recovery must be 90 - 115%. Samples that fail surrogate recovery must be reanalyzed. If second analysis fails label result as suspect/matrix
Sect. 9.4.3	Field or Laboratory Duplicates	Analyze either a field or laboratory duplicate for a minimum of 5% of field samples or at least one within each analysis batch for both detectors Calculate the relative percent difference (RPD) using formula in Section 9.4.3.1	The RPD for concentrations at MRL to 5 x MRL should be ± 20% on both detectors, and ± 10% on both detectors for concentrations at 5 x MRL to highest CCCS. If this range is exceeded, label both as suspect/matrix

TABLE 6. EXAMPLE SAMPLE ANALYSIS BATCH WITH QUALITY CONTROL REQUIREMENTS

Injection #	Sample Description	Acceptance Criteria
1	Laboratory reagent blank (LRB)	≤ ½ MRL
2	ICCS conductivity detector (5.0 µg/L)	3.75 to 6.25 µg/L
3	ICCS absorbance detector (0.5 µg/L)	0.375 to 0.625 µg/L
4	Laboratory Fortified Blank (LFB) - conductivity detector	± 25 % fortified level
5	LFB - absorbance detector	± 25 % fortified level
6	Field sample 1	
7	Field sample 1 - Laboratory Duplicate (LD) [a]	± 15 % RPD
8	Field sample 2	
9	Field sample 2 - Laboratory Fortified Matrix (LFM) [a] at concentrations specific for conductivity detector	± 25% fortified level
10	Field sample 2 - LFM specific for trace bromate on the absorbance detector	± 25% fortified level
11	Field sample 3	
12	Field sample 4	
13	Field sample 5	
14	Field sample 6	
15	Field sample 7	
16	Field sample 8	
17	Field sample 9	
18	Field sample 10	
19	CCCS conductivity detector (75.0 µg/L)	63.8 to 86.3 µg/L
20	CCCS absorbance detector (5.0 µg/L)	4.25 to 5.75 µg/L
21	Field sample 11	
22	Field sample 12	

23	Field sample 13	
24	Field sample 14 - (finished water from PWS using chlorine dioxide)	
25	Pretreated LRB (Section 9.3.1.2) using the acid/Fe(II) chlorite removal procedure (Section 11.1.4)	≤ ½ MRL
26	Field sample 14 [b] - (finished water from PWS using chlorine dioxide) pretreated with acid/Fe(II) (Section 11.1.4)	
27	Field sample 14 - (finished water from PWS using chlorine dioxide) LFM specific for trace bromate on the absorbance detector, pretreated with acid/Fe(II) (Section 11.1.4.2)	± 25% fortified level
28	Field sample 15	
29	Field sample 16	
30	Field sample 17	
31	Field sample 18	
32	Field sample 19[b]	
33	ECCS conductivity detector (500.0 µg/L)	425 to 575 µg/L
34	ECCS absorbance detector (15.0 µg/L)	12.8 to 17.3 µg/L

[a] If no analytes are observed above the MRL for a sample, an alternate sample which contains reportable values should be selected as the laboratory duplicate. Alternately, the LFM can be selected and reanalyzed as the laboratory duplicate ensuring the collection of QC data for precision.

[b] Field sample #19 was the final field sample permitted in this batch but 20 total field samples were analyzed.
Field sample #14 was analyzed both initially and as a acid/Fe (II) pretreated sample, therefore, it accounted for two "field sample analyses" toward the maximum of twenty in an analysis batch (Section 3.1).

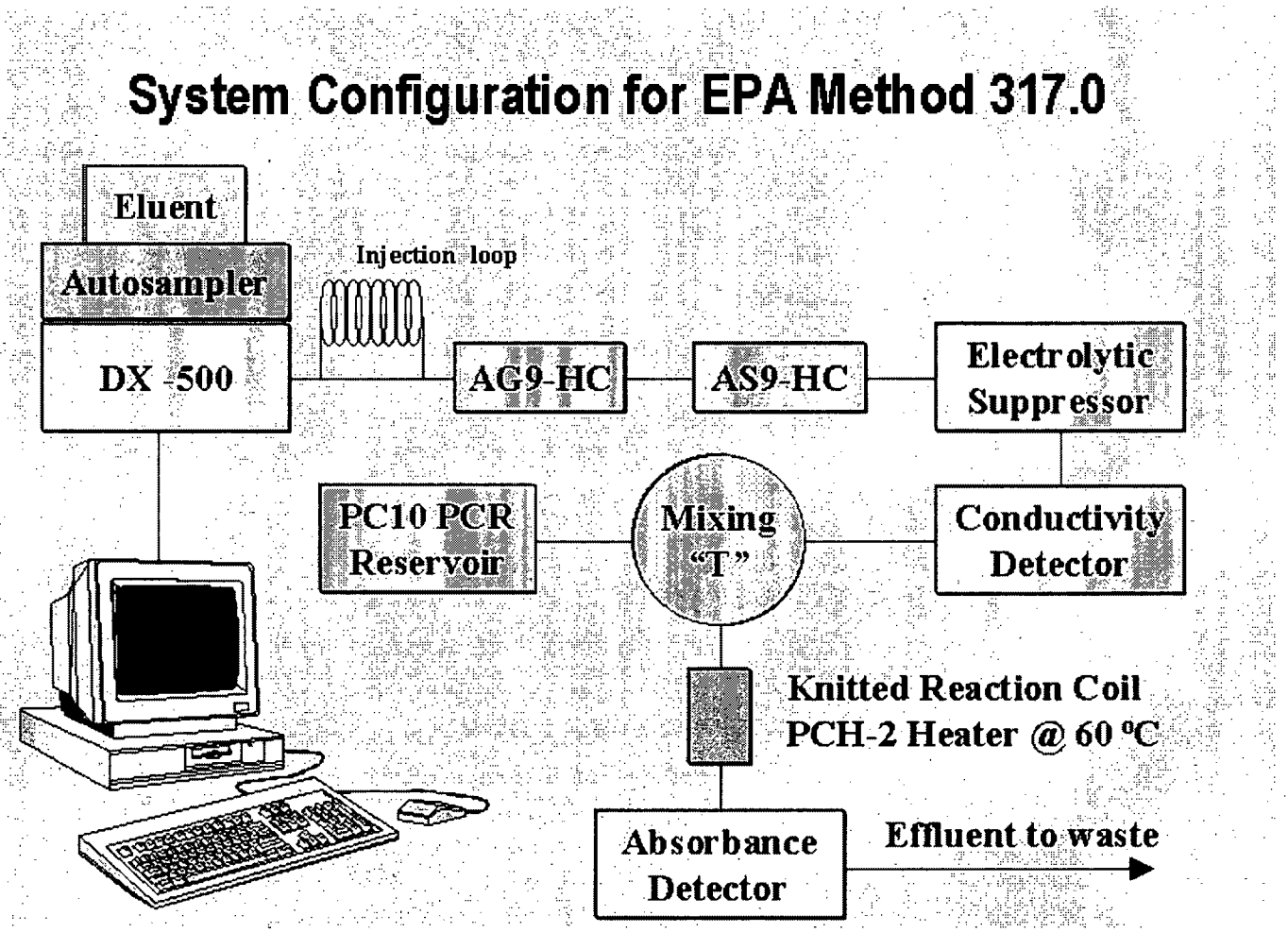


Figure 1: Schematic detailing the configuration of postcolumn hardware addition to an ion chromatograph. Mention of trade names or commercial products does not constitute endorsement or recommendation for use. If the requirements found in Section 9 are met, equivalent products or hardware can be employed.

NOTE: In a typical Method 300.1 hardware configuration, a backpressure coil is included after the conductivity cell as part of the waste stream when this manufacturer's equipment is used. These backpressure coils are not required when the Method 317.0 instrument configuration is employed since the additional PCR system components, placed in-line, function in the same capacity and provide sufficient backpressure.

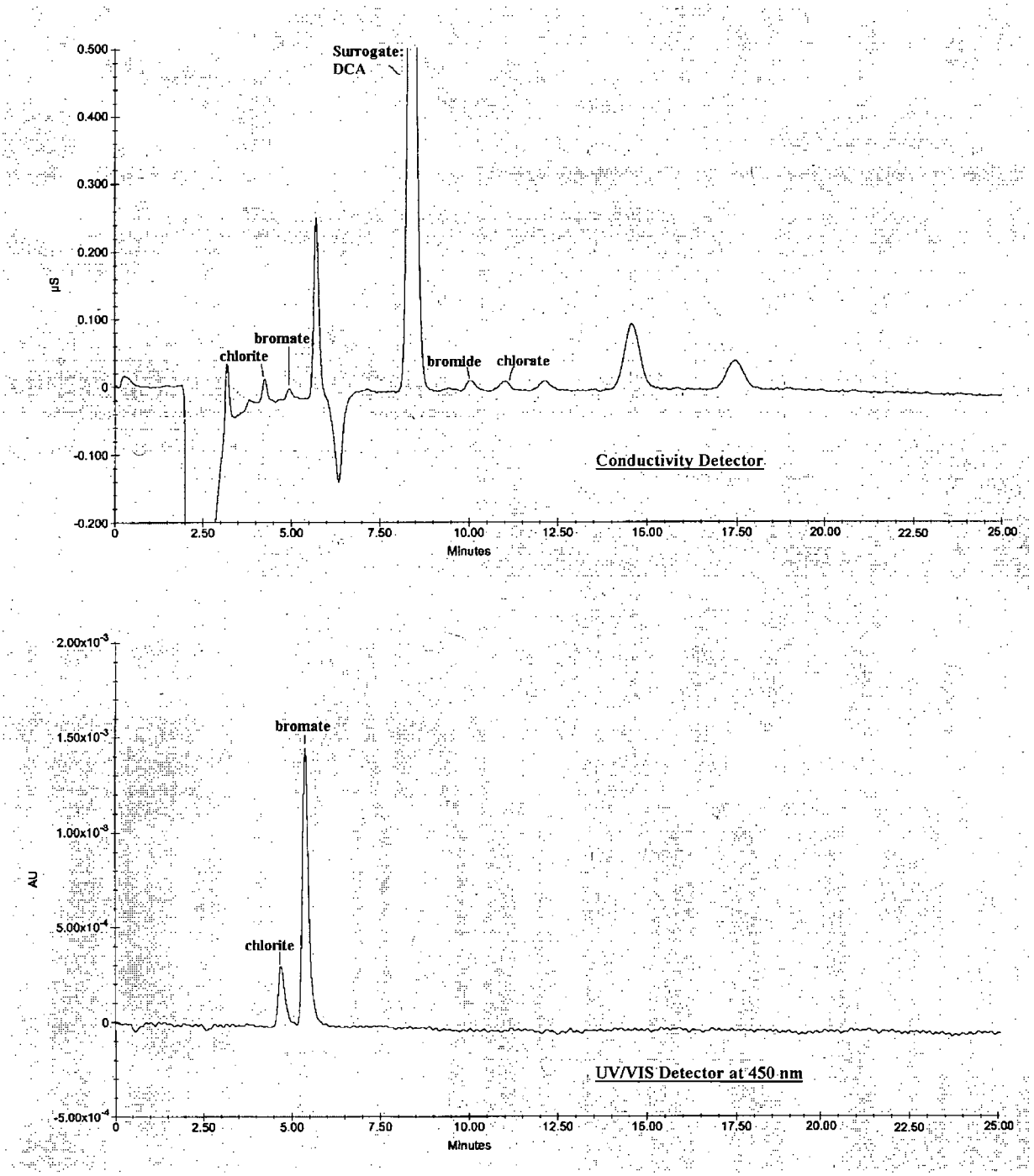


Figure 2: Reagent water fortified with inorganic disinfection by-products and bromide at 10 ug/L.

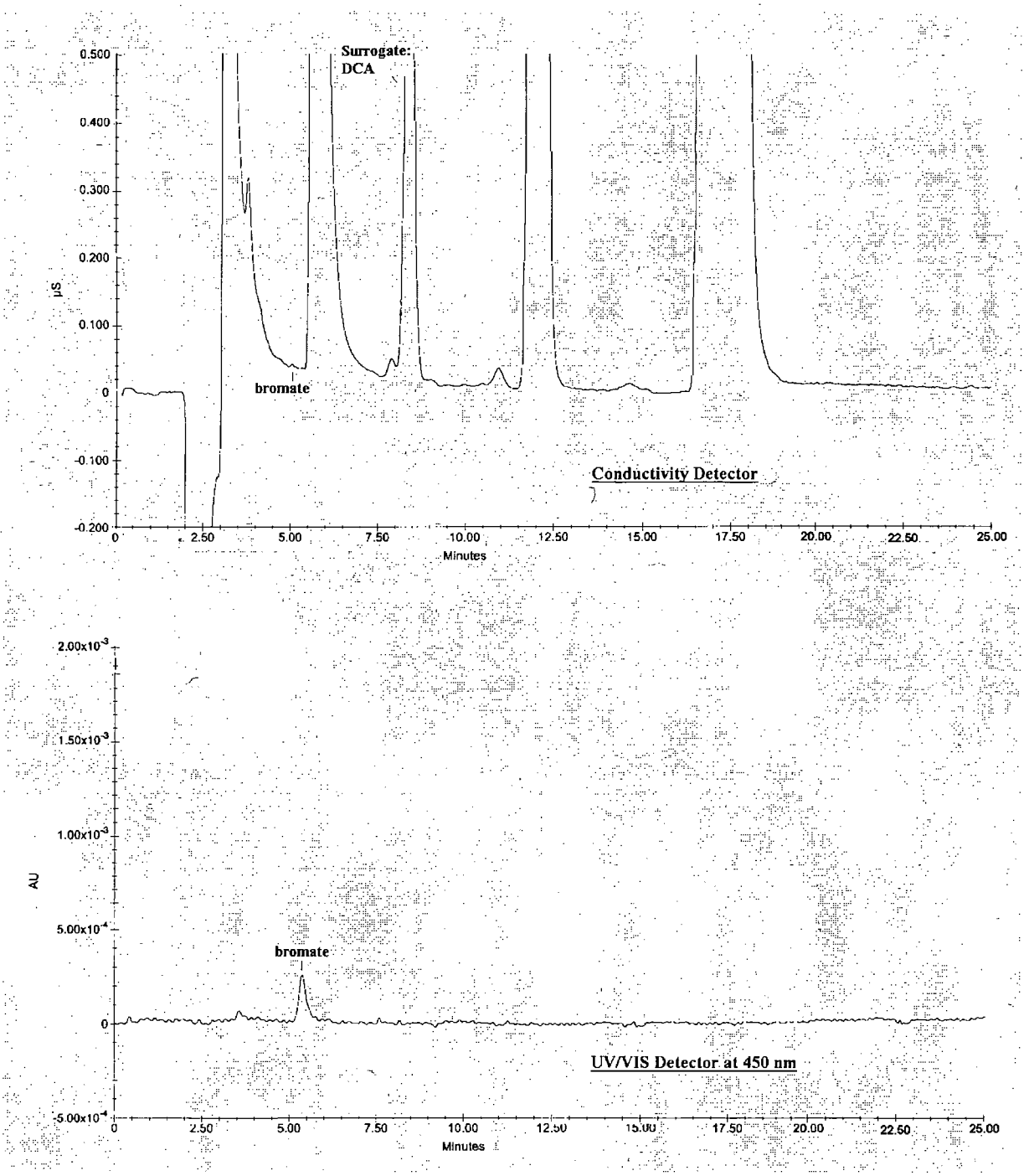


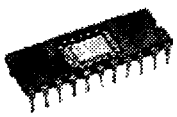
Figure 3: Chlorinated tap water fortified with bromate at 2.0 ug/L.

Tom Ong
<tomong@wvdhhr.org>
10/24/2006 10:37 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc
bcc
Subject Tracy's Certificate

I still don't have a copy of Tracy's certificate. Ex. 6 - Personal Privacy
Ex. 6 - Personal Privacy She is scheduled to come back some time next week.

Thomas L. Ong, Microbiologist Supervisor
Chief - Laboratory Certification Officer
Chief - Laboratory Evaluation Officer
WVDHHR - BPH
Office of Laboratory Services
167 - 11th Avenue
South Charleston, WV 25303
Phone: 304-558-3530, Ext. 2710
email: tomong@wvdhhr.org



Ed Kratz/R3/USEPA/US
10/24/2006 11:33 AM

To
cc
bcc Joe Slayton/ESC/R3/USEPA/US
Subject Warning – Spoof Emails Circulating

Note: We are using bcc to send this message to everyone.

There have been reports of a number of fake emails circulating in the Region purporting to be from Ebay, the Credit Union National Association, various banks, etc.
Please remember, do not respond to these emails, and do not click on links in those emails. Do not call any phone numbers or contacts listed in these emails.These are attempts to have you go to a false site and enter your personal information.
If you want to read more information about identity theft, please go to the CSB's intranet site at http://intranet.epa.gov/r3intran/oirm/id_theft.htm#phish

Please let me know if you have any questions.

Ed Kratz, CISSP
Information Security Officer
U.S. EPA Region 3
(215)814-5351
kratz.ed@epa.gov

WandaF
Johnson/R3/USEPA/US
10/24/2006 10:29 AM

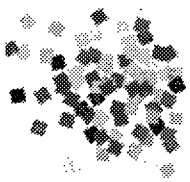
To Joe Slayton/ESC/R3/USEPA/US@EPA
cc
bcc
Subject Fw: Need help in answering lab cert question

Joe, per my v-mail to you, here is the response from Jason Gambatese to your question.

Wanda - WV adopts our regs by reference and our regs do not require that a certified lab analyze any of those parameters so it's okay from our standpoint. I know Joe's group does certification of some of those parameter, but I don't think we can require it.

Jason Gambatese
Environmental Scientist
Drinking Water Branch
1650 Arch Street (3WP21)
Philadelphia, PA 19103
p: (215) 814-5759
f: (215) 814-2318
gambatese.jason@epa.gov
WandaF Johnson/R3/USEPA/US

1). The listing of analytes reviewed by the WV SDWA Lab Cert program in the assessment of laboratories does not include the following analytes: turbidity, pH, silica, PO4, conductivity, TOC, SUVA, calcium/hardness and alkalinity. Ok?



Ruth-Ann Donovan/ESC/R3/USEPA/US
10/24/2006 10:12 AM

To R3 ESC-ASQAB, R3 ESC-DC GOV, R3 ESC-FIP, R3 ESC-OPM
cc
bcc
Subject Frame of Reference

All,

Many of you don't know Margaret Mason who was Ort Villa, our former Director's, secretary for many years [Ex. 6 - Personal Privacy]

Thank You,

Ruth Ann

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Ex. 5 - Deliberative

Tom Ong
<tomong@wvdhhr.org>
11/28/2006 08:41 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc
bcc
Subject WV - WVAW On-site Evaluation

Joe,

Attached is the complete on-site evaluation for WVAW - Kanawha Valley T reatment Plant. I will fax you their response.

Thomas L. Ong, Microbiologist Supervisor
Chief - Laboratory Certific ation Officer
Chief - Laboratory Evaluation Officer
WVDHHR - BPH
Of fice of Laboratory Services
167 - 11th Avenue
South Charleston, WV&nbs p; 25303
Phone: 304-558-3530, Ext. 2710
email: tomong@wvdhhr.org


WVAW Kan 9-21-06 Complete.pdf

STATE OF WEST VIRGINIA
DEPARTMENT OF HEALTH AND HUMAN RESOURCES

Joe Manchin III
Governor

ENVIRONMENTAL MICROBIOLOGY

Martha Yeager Walker
Secretary

Report of an On-Site Evaluation of
West Virginia American Water – Kanawha Valley Treatment Plant
Court and Dryden Streets
Charleston, WV 25301
WV Laboratory Number: 00201 CM
USEPA Number: WV00046
On
September 21, 2006
By
Thomas L. Ong, Microbiologist Supervisor
Chief - Laboratory Certification Officer
And
Michael A. Flesher, M.P.H., Microbiologist III
Laboratory Certification Officer

Date of Last On-Site: July 24, 2003

Date of Report: September 27, 2006

Previous Laboratory Status:	**Fully Certified for the Microbiological Analysis of Drinking Water: Total Coliforms by SM 9223 B (Colilert) and *E. coli* by SM 9223 B (Colilert).**
Present Laboratory Status:	**Fully Certified for the Microbiological Analysis of Drinking Water: Total Coliforms by SM 9223 B (Colilert) and *E. coli* by SM 9223 B (Colilert) pending a satisfactory written response to this report within 60 days [ending November 27, 2006].**

BUREAU FOR PUBLIC HEALTH
OFFICE OF LABORATORY SERVICES
167 – 11th Avenue
South Charleston, WV 25303-1137

Phone: (304) 558-3530, Ext. 2710

FAX: (304) 558-2006

I. At the time of the on-site evaluation, the following items were not in compliance with the minimum standards set forth in the U.S.E.P.A.'s *Manual for the Certification of Laboratories Analyzing Drinking Water*, Fifth Edition, January 2005:

Item	Deviation
	Laboratory Facilities
2.0	The laboratory must make provisions for the proper disposal of microbiological waste (i.e., total coliform positive Colilert samples). An acceptable protocol is to add a few mL's of bleach to the positive sample, swirl, let stand several hours to overnight and then discard.
	Laboratory Equipment and Supplies
3.1.4*	pH meters must be standardized before each use period with pH 7.0 and either pH 4.0 or 10.0 standard buffers, whichever range covers the desired pH of the media or reagent. The date and buffers used must be recorded in a logbook, along with analyst's initials. The buffers used were not being recorded in the QC Record Book. Please begin recording this information and send a copy with the response to this report.
3.3.2*	The calibration of glass and electronic thermometers must be checked annually, and dial thermometers quarterly, at the temperature used, against a National Institute of Standards and Technology (NIST)-traceable reference thermometer or one that meets the requirements of NBS Monograph SP 250-23. The calibration factor and date of calibration must be indicated on the thermometer. In addition, the laboratory must record in a QC record book the following information: ➢ Serial number of laboratory thermometer ➢ Serial number of NIST-traceable thermometer (or other reference thermometer) ➢ Temperature of laboratory thermometer ➢ Temperature of NIST-traceable thermometer (or other reference thermometer) ➢ Correction (or calibration) factor ➢ Date of check ➢ Analyst's initials The serial number for the NIST-traceable thermometer was not being recorded in the QC Record Book. Without this information, the test thermometer cannot be traced back to a reference thermometer. Included with this report is an MS Excel Spreadsheet that can be used for calibrating thermometers and captures all of

the required information and automatically computes the correction factor and interpretations.

3.14.2 Graduated cylinders for measurement of sample volumes must be accurate to within a 2.5% tolerance. In lieu of graduated cylinders, pre-calibrated containers that have clearly marked volumes accurate to within a 2.5% tolerance may be used.

The 100 mL mark on the Colilert sample bottles must be verified using a Class A graduated cylinder. Checking and recording the volume of one sample bottle per lot is acceptable. A form for recording this information is included with this report. Please begin verifying the 100 mL mark with the lot that is currently on hand and return a completed copy with the response to this report.

Analytical Methodology

5.1.3 Water samples must be shaken vigorously at least 25 times before analyzing.

The only time that this is not necessary is when the sample arrives with 100 mL (± 2.5 mL) of sample. Otherwise, the sample must be shaken 25 times (within 7 seconds with a 1 ft movement) and the excess sample removed either with a sterile pipette or pouring off.

5.1.5 Sample volume analyzed for total coliforms in drinking water must be 100 mL.

Samples volumes observed during the on-site contained approximately 110 mL. This is too much and will dilute the Colilert reagent making it less sensitive. Please be sure that all analysts are aware of this fact. Samples that contain < 97.5 mL are to be rejected and re-sampled.

Sample Collection, Handling and Preservation

6.5 After collection, the sampler must enter on a sample information form, in indelible ink.

There were several occasions where a sampler used a pencil to complete the collection form. Please instruct all samplers that the collection form must be completed in ink.

Records and Data Reporting

8.1 Legal Defensibility: Compliance monitoring data must be made legally defensible by keeping thorough and accurate records. The QA plan and/or SOPs must describe the policies and procedures used by the facility for record retention and storage. If samples are expected to become part of a legal action, chain-of-custody procedures must be used.

The QA Plan simply states: "The QA plan and/or SOPs must describe the policies and procedures used by the facility for record retention and storage." Please update the QA plan to reflect how the records are actually stored and submit the section of the QA Plan that describes this with the response to this report.

8.3 Sampling Records: Data must be recorded in ink with any changes lined through such that original entry is visible. Changes must be initialed and dated.

See Item 6.5.

8.4 Analytical Records: Data must be recorded in ink with any changes lined through such that original entry is visible. Changes must be initialed and dated.

Please instruct all analysts on the proper way to make corrections.

8.5 Laboratories must maintain preventive maintenance and repair activities records for all instruments and equipment (including pH meters, analytical balances, incubators, refrigerators, autoclaves, and water baths). Records must be kept for five years in a manner that allows for easy inspection.

Please begin keeping Preventative Maintenance and Repair Records for the pH Meter, Refrigerator and Incubator.

II. General Remarks and Comments

1. Attached are forms that were especially designed for laboratories that use only Colilert and purchase commercially prepared Tryptic Soy Broth. By keeping these forms complete and up-to-date, all of the required quality control information will be captured (with the exception of thermometer calibrations and refrigeration/incubation temperatures).

2. Also attached is an MS Excel spreadsheet that can be used for performing thermometer calibrations. The form is self explanatory.

3. When it is necessary to replace the thermometers in the incubator and refrigerator, it is recommended that they be replaced with digital ones. The digital thermometers are generally readable in 0.1°C and their large displays make them easier to read. Their probes can usually be placed inside the incubator with the main unit attached to the outside of the incubator/refrigerator. This allows for the temperature being read without opening the door. Finally, digital thermometers eliminate the mercury hazard associated with glass thermometers.

4. There were 3 thermometers in the 35°C incubator and 2 in the refrigerator. The

only requirement for the 35°C incubator is that a thermometer be placed on the top and bottom shelves of use. The refrigerator only requires 1 thermometer.

5. The laboratory is to be commended for developing their MS Access Sample Database.

III. Conclusion

Although the procedures, records, facilities and/or equipment in use at the time of the evaluation did not substantially comply with the U.S.E.P.A.'s *Manual for the Certification of Laboratories Analyzing Drinking Water*, 5th Edition, January 2005, the analyst/facility deviations noted are readily correctable. This laboratory is Certified for 60 days [ending November 27, 2006] pending correction of the deviations. Corrections must be made and detailed in writing to the Certification Officer during this period. Items marked with a "*" require the submission of the appropriate QA/QC Record for verification. Items marked with a "**" require immediate attention as they are repeat deviations that occurred during the previous onsite evaluation.

In order for a laboratory to maintain Certification, they must:

1. Adequately respond to on-site evaluations within the specified time frame (with any requests for extensions being made in writing prior to the due date),

2. Successfully participate in the Annual Proficiency Testing Program (Split Samples) by September 30th of each calendar year for all procedures for which Certification has been granted,

3. Submit the annual certification renewal fee,

4. Report any changes in personnel and/or equipment to this office within 30 days.

If there are any questions regarding this report or further assistance is needed, please do not hesitate to contact this office.

Sincerely,

Thomas L. Ong, Microbiologist Supervisor
Chief - Laboratory Certification Officer

STATE OF WEST VIRGINIA
DEPARTMENT OF HEALTH AND HUMAN RESOURCES

Joe Manchin III
Governor

ENVIRONMENTAL MICROBIOLOGY

Martha Yeager Walker
Secretary

ON-SITE EVALUATION CHECKLIST

Laboratory:	West Virginia American Water – Kanawha Valley Treatment Plant				
Mailing Address:	P. O. Box 1906				
City:	Charleston	State:	WV	Zip:	25327
Telephone:	304-340-2999	FAX:	304-340-2064		
Email:	dpeters@wvwater.com				
Shipping Address:	WVAW Kanawha Valley Treatment Plant				
	Court & Dryden Streets				
	Charleston, WV 25301				
Date(s) of On-site:	September 21, 2006				

Position Title	Name	Time In Present Position	Academic Training and/or Degree	Present Specialty	Experience (Years/Area)
Laboratory Director	Tom Holbrook	17 Yrs.	B.S. Chemistry	Water Quality Chemistry	34 Yrs.
Supervisor/ Consultant	David Peters	2 Yrs.	B.S. Chemistry/ M.B.A.	Drinking Water Chem & Micro	29 Yrs.
Professional (Note Discipline)					
Technician/ Analyst	Jon Jarvis	7 Yrs.	B.S. Chemistry	Drinking Water Chem & Micro	7 Yrs.
Technician/ Analyst	Don Ash	7.5 Yrs.	B.S. Forestry	Drinking Water Micro	4 Yrs
Technician/ Analyst					
Technician/ Analyst					
Technician/ Analyst					
Technician/ Analyst					
Technician/ Analyst					

CODES FOR MARKING CHECKLIST:

Y = YES N = NO O = NOT APPLICABLE ? = UNDETERMINED

BUREAU FOR PUBLIC HEALTH
OFFICE OF LABORATORY SERVICES
167 – 11th Avenue
South Charleston, WV 25303-1137

Phone: (304) 558-3530, Ext. 2710 FAX: (304) 558-2006

EQUIPMENT LIST

EQUIPMENT	MANUFACTURER	MODEL NUMBER
pH Meter	1. Orion 2.	1. 720A 2.
Balances	1. 2.	1. 2.
NIST (NBS) Thermometer	1. Ertco 2.	1. 197-565 2.
Incubator Total Coliform (35.0°±0.5°C)	1. Gaileokamp 2.	1. IPR225 2.
Incubator/Water Bath Fecal Coliform (44.5°±0.2°C)	1. 2.	1. 2.
Autoclave	1. 2.	1. 2.
Hot Air Oven	1. 2.	1. 2.
Colony Counter	1. 2.	1. 2.
Conductivity Meter	1. 2.	1. 2.
Refrigerators	1. ISO Temp/Fisher 2. Marvel	1. Fisher 8P63 2. 61RF
Membrane Filtration Equipment	1. 2.	1. 2.
Membrane Filtration Filters	1. 2.	1. 2.
Reagent Water Purification System	1. 2.	1. 2.

ELEMENT	ITEM	Y/N/O	COMMENTS
1. PERSONNEL			
Supervisor/Consultant	1.1		
Does the supervisor of the microbiology laboratory have a bachelor's degree in microbiology, biology, or equivalent?		Y	
Has a supervisor with a degree in a subject other than those listed above had at least one college-level microbiology laboratory course in which environmental microbiology was covered?		O	
In addition, has the supervisor had a minimum of two weeks training at a Federal or State agency or academic institution in microbiological analysis of drinking water or 80 hours of on-the-job training in water microbiology at a certified laboratory, or other training acceptable to the State or EPA?		Y	
If a supervisor is not available, and a waiver has not been granted as per Section 1.3, is a consultant with the same qualifications substituted?		O	
If a supervisor is not available, and a waiver has not been granted as per Section 1.3, is a consultant with the same qualifications substituted?		O	
Can the laboratory supervisor demonstrate that all laboratory personnel have the ability to satisfactorily perform the analyses to which they are assigned?		Y	
Can the laboratory supervisor demonstrate that all data reported by the laboratory meets the required quality assurance and regulatory criteria?		Y	
Analyst (or equivalent job title)	1.2		
Does the analyst have at least a high school education, a minimum of three months bench experience in water, milk or food microbiology, training in microbiological analysis of drinking water acceptable to the State (or EPA), and a minimum of 30 days on-the-job training under an experienced analyst?		Y	
Has the analyst demonstrated acceptable results on unknown samples before analyzing compliance samples?		Y	
Waiver of Academic Training	1.3	O	
Has the certification authority waived the need for the above specified academic training for highly experienced analysts in this laboratory?		O	
Has the certification authority waived the need for the above specified training for supervisors of laboratories associated with drinking water systems that only analyze samples from that system?		O	
If yes to either of the above, does the laboratory have a copy of that written and signed waiver available for inspection?		O	
Personnel Records	1.4		
Does the laboratory maintain personnel records on laboratory analysts that include academic background, specialized training courses completed, and types of microbiological analyses conducted?		Y	
2. LABORATORY FACILITIES			
Does the laboratory have facilities that are clean and temperature and humidity controlled, and with adequate lighting at the bench tops?		Y	
Does the laboratory maintain effective separation of incompatible testing areas?		Y	
Does the laboratory control access where appropriate, and minimize traffic flow through the work areas?		Y	
Does the laboratory ensure that contamination does not adversely affect data Quality?		Y	
Does the laboratory have bench tops and floors that are easily cleaned and disinfected?		Y	
Does the laboratory have sufficient space for processing samples; storage space for media, glassware, and portable equipment; floor space for stationary equipment; and areas for cleaning glassware and sterilizing materials?		Y	
Does the laboratory have provisions for disposal of microbiological wastes?		N	
3. LABORATORY EQUIPMENT AND SUPPLIES			
Does the laboratory have the equipment and supplies needed to perform the approved methods for which certification has been requested?		Y	
pH meter	3.1		
Are accuracy and scale graduations within ±0.1 units?	3.1.1	Y	
Are pH buffer aliquots used only once?	3.1.2	Y	

ELEMENT	ITEM	Y/N/O	COMMENTS
Are electrodes maintained according to the manufacturer's recommendations?	3.1.3	Y	
QC Are pH meters standardized before each use period with pH 7.0 and either 4.0 or 10.0 standard buffers, whichever covers the desiredpH of the media or reagent?	3.1.4	Y	
QC Are both the daze and buffers used recorded in a logbook along with the analysts initials?		N	
QC Is the pH slope recorded monthly, after calibration?	3.1.5	Y	
QC If the pH meter does not have a feature to automatically calculate the slope, but canprovide in the pH in millivolts, is the formula in Section 3.1.5.1 used to calculate the slope?	3.1.5.2	O	
QC If the slope is below 95% or above 105%, are the manufacturer's instructions followed for meter or electrode maintenance and general cleaning?	3.1.6	O	
QC Are commercial pH buffer solutions dated when received and when opened?		Y	
QC Are pH buffer solutions discarded by the expiration date?		Y	
Temperature Monitoring Device	3.3		
Are glass, dial, or electronic thermometers graduated in 0.5°C increments (0.2°C increments for tests which are incubated at 44.5°C) or less, except as noted for hot air ovens (Section 3.6.1) and refrigerators (Section 3.9.1)?	3.3.1	Y	
Does observation of glass thermometers indicate no separation in fluid columns?		Y	
Are only dial thermometers which can be adjusted used?		O	
QC Are glass and electronic thermometers calibrated annually and dial thermometers quarterly at the temperature used, against a NIST-traceable reference thermometer or one that meets the requirements of NBS Monograph SP 250-23?	3.3.2	Y	
QC Are both the calibration factor and calibration date indicated on the		Y	
QC Is the following calibration information recorded in a QC record book?			
- Serial number of the laboratory thermometer		Y	
- Serial number of the NIST-traceable thermometer (or other reference thermometer)		N	
- Temperature of the laboratory thermometer		Y	
- Temperature of the NIST-traceable thermometer(or other reference		Y	
- Correction (or calibration) factor		Y	
- Date of check		Y	
- Analyst's initials		Y	
QC Is the thermometer discarded if it differs by more than 1°C from the reference thermometer?	3.3.3	Y	
QC Are reference thermometers recalibrated at least every five years?		Y	
QC Is reference thermometer calibration documentation maintained?		Y	
QC Are continuous recording devices used to monitor incubator temperature recalibrated at least annually, using a reference thermometer that meets the specifications noted in Section 3.3.2?		O	
Incubator Unit	3.4		
Do incubator units have an internal temperature monitoring device and maintain a temperature specified by the method used, usually 35°±0.5°C and 44.5°±0.2°C?	3.4.1	Y	
For non-portable incubators, are thermometers placed on top and bottom shelves of the use area and immersed in liquid as directed by the manufacturer (except for electronic thermometers)?		Y	
When aluminum block incubators are used, do culture dishes and tubes fit snugly?		O	
QC Is the calibration-corrected temperature recorded for each thermometer being used at least twice per day during each day the incubator is in use?	3.4.2	Y	
QC Are these readings separated by at least four hours?		Y	
QC Does the documentation include the date and time of reading, temperature, and technician's initials?		Y	
If a circulating water bath is used, is it equipped with a gable cover to ensure an incubation temperature of 44.5E±0.2EC?		O	
Refrigerator	3.9		

ELEMENT	ITEM	Y/N/O	COMMENTS
Does the refrigerator maintain a temperature of 1°-5°C?	3.9.1	Y	
Is the refrigerator thermometer graduated in at least 1°C increments and the thermometer bulb immersed in liquid?		Y	
QC On days the refrigerator is in use, and the laboratory is staffed, is the calibrated-corrected temperature recorded at least once per day?	3.9.2	Y	
Pipets	3.13	O	
Are glass pipets sterilized and maintained in stainless steel or aluminum canisters or wrapped individually in char-resistant paper or aluminum foil?	3.13.1	O	
Do pipets have legible markings and are they not chipped or etched?	3.13.2	O	
Are opened packs of disposable sterile pipets resealed between use periods?	3.13.3	O	
Are pipets delivering volumes of 10 mL or less accurate to within a 2.5% tolerance?	3.13.4	O	
Are calibrated micropipetters used with sterile tips?	3.13.5	O	
Are micropipetters calibrated annually and adjusted or replaced if the precision or accuracy is greater than 2.5%?		O	
Glassware and Plasticware	3.14		
Is the glassware made of borosilicate glass, or other corrosion-resistant glass, and free of chips and cracks?	3.14.1	Y	
Are markings on graduated cylinders and pipets legible?		Y	
Are plastic items clear and nontoxic to microorganisms?		Y	
QC Are the graduated cylinders used for measurement of sample volumes, or other precalibrated containers that have clearly marked volumes used in lieu of graduated cylinders, accurate to within a 2.5% tolerance?		N	
Are culture tubes and containers containing fermentation medium of sufficient size to contain medium plus sample without being more than three quarters full?	3.14.3	O	
Are tube closures made of stainless steel, plastic, aluminum, or screw caps with nontoxic liners?	3.14.4	Y	
Are cotton or foam plugs used?		O	
Sample Containers	3.15		
Are sample containers wide-mouth plastic or non-corrosive glass bottles with non-leaking ground glass stoppers or caps with nontoxic liners, sterile plastic bags containing sodium thiosulfate, or other appropriate sample containers?	3.15.1	Y	
Is sample container capacity at least 120 mL (4 oz) to allow at least a 1-inch head space?		Y	
Are glass stoppers covered with aluminum foil or char-resistant paper for sterilization?	3.15.2	O	
Are unsterilized glass and plastic bottles sterilized by autoclaving or, alternatively, by dry oven for glass bottles?	3.15.3	O	
Are empty containers moistened with several drops of water before autoclaving to prevent an Aair lock@ sterilization failure?		O	
If chlorinated water is to be analyzed, is sufficient sodium thiosulfate added to the sample bottles before sterilization to neutralize any residual chlorine in the water sample?	3.15.4	Y	
Ultraviolet Lamp (if used)	3.16		
Is the germicidal unit disconnected monthly and the lamp cleaned by wiping with soft cloth moistened with ethanol?	3.16.1	O	
Is the longwave unit used for fluorometric tests kept clean?		Y	
QC Is the germicidal unit tested quarterly with a UV light meter or agar spread plate?	3.16.2	O	
QC Is the lamp replaced if it emits less than 70% of its initial output or if an agar spread plate containing 200 to 250 microorganisms, exposed to the UV light for two minutes, does not show a count reduction of 99%?		O	
4. GENERAL LABORATORY PRACTICES			
Are laboratory personnel aware of general and customary safety practices for laboratories?		Y	
Does the laboratory have a safety plan available?		Y	

ELEMENT		ITEM	Y/N/O	COMMENTS
Does the laboratory keep a copy, and follow the personal protection guidelines, of any material safety data sheet accompanying the receipt of a toxic material?			Y	
Sterilization Procedures		4.1	O	
Does the laboratory follow the minimum times for autoclaving the materials listed below at 121°C?		4.1.1	O	
- Membrane filters and pads	10 min		O	
- Carbohydrate containing media	12-15 min[1]		O	
- Contaminated test materials	30 min[2]		O	*Disinfected with Bleach*
- Membrane filter assemblies	15 min		O	
- Sample collection containers	15 min		O	
- Individual glassware	15 min		O	
- Dilution water blank	15 min		O	
- Rinse water (0.5 - 1 L)	15-30 min[2]		O	
1 except where otherwise specified by the manufacturer				
2 time depends upon water volume per container and autoclave load				
Are autoclaved membrane filters and pads and all media removed immediately after completion of the sterilization cycle?		4.1.2	O	
Is membrane filter equipment autoclaved before the beginning of a filtration series?		4.1.3	O	
If a UV light (254 nm) is used to sanitize equipment after initial autoclaving for sterilization, are all supplies presterilized?		4.1.4	O	
Sample Containers		4.2		
QC Is at least one sample container selected at random from each batch of sterile sample bottles, or other containers (or lot of commercially available sample containers), and the sterility confirmed by adding 25 mL of a sterile non-selective broth, incubating at 35°±0.5°C, and checking for growth after 24 and 48 hours?			Y	
QC Are these results recorded?			Y	
QC If growth is detected, is the entire batch resterilized?			Y	
Dilution/Rinse Water		4.4	O	
Is stock buffer solution or peptone water prepared as specified in Standard Methods, Section 9050C?		4.4.1	O	
Are stock buffers autoclaved or filter-sterilized?		4.4.2	O	
Are these containers labeled, dated, and refrigerated?			O	
Are stored stock buffers free from turbidity?			O	
QC Is each batch (or lot, if commercially prepared) of dilution/rinse water checked for sterility by adding 50 mL of water to 50 mL double strength non-selective broth, incubating at 35°± 0.5°C, and checking for growth after 24 hours and 48 hours?		4.4.3	O	
QC Are these results recorded?			O	
QC Is the batch/lot discarded if growth is detected?			O	
Glassware Washing		4.5	O	*All Disposable*
Is distilled or deionized water used for the final rinse?		4.5.1	O	
Is laboratory glassware washed with a detergent designed for laboratory use?		4.5.2	O	
QC Is the glassware inhibitory residue test performed before the initial use of a washing compound and whenever a different formulation, or washing procedure is used?		4.5.3	O	
QC Are these results recorded?			O	
QC Is each batch of dry glassware used for microbial analysis spot-checked for pH reaction using 0.04% bromthymol blue (or equivalent pH indicator) and the color reaction recorded?		4.5.4	O	
5. ANALYTICAL METHODOLOGY				
General		5.1		
For compliance samples, does the laboratory use only the analytical methodologies specified in the Total Coliform Rule (TCR), the Surface Water Treatment Rule (SWTR), and the Groundwater Rule (GWR)?		5.1.5	Y	
Is the laboratory certified for all analytical methods it uses for compliance purposes?		5.1.2	Y	

ELEMENT	ITEM	Y/N/O	COMMENTS
At a minimum, is the laboratory certified for one total coliform method and one fecal coliform or E. coli method?		Y	
Is the laboratory certified for a second total coliform method if one method cannot be used for some drinking waters?		O	
For a laboratory that enumerates heterotrophic bacteria for compliance with the SWTR, is the laboratory certified for either the Pour Plate Method or the SimPlate method for heterotrophic bacteria?		O	
Are water samples shaken vigorously at least 25 times before analyzing?	5.1.3	N	
QC If dilution buffer is used, does the laboratory check the buffer volume in one dilution bottle of each batch or lot?	**5.1.4**	O	
QC For a 90-mL or 99-mL volume, is the tolerance ±2 mL?		O	
Does the laboratory analyze a 100-mL sample volume for total coliforms in drinking water?	5.1.5	N	
Media (or defined substrate)	**5.1.6**		
Are dehydrated media stored in a cool dry location and discarded by the manufacturer's expiration date?	**5.1.6.1**	O	
Is caked or discolored dehydrated media discarded?		O	
QC For media prepared in the laboratory is the following information recorded?	**5.1.6.2**		
- Date of preparation		O	
- Type of medium		O	
- Lot number		O	
- Sterilization time and temperature		O	
- Final pH (after sterilization)		O	
- Technician's initials		O	
QC For media prepared commercially is the following recorded for each lot?	**5.1.6.3**		
- Date received		Y	
- Type of medium		Y	
- Lot number		Y	
- pH verification		Y	
QC Are media prepared commercially discarded by manufacturer's expiration date?		Y	
QC Is each new lot of dehydrated or prepared commercial medium and each batch of laboratory-prepared medium checked before use for sterility and with positive and negative culture controls?	**5.1.6.4**	Y	
QC Are these results recorded?		Y	
QC For laboratories using commercially prepared media with manufacturer shelf-lives of greater than 90 days, are positive and negative controls run each quarter, in addition to that noted above?		Y	
QC Are these results recorded?		Y	
QC For control organisms, are stock cultures periodically checked for purity and the results recorded, or are commercially available disks impregnated with the organism used?		Y	
If prepared medium is stored after sterilization, is it maintained in the dark as follows?	**5.1.6.5**	O	
- poured plates 1° - 5°C 2 weeks		O	
- broth in containers with loose-fitting closures 1° - 30°C 2 weeks		O	
- broth in tightly closed containers 1° - 30°C 3 months		O	
QC Does the laboratory perform parallel testing between a newly approved test and another EPA-approved procedure for enumerating total coliforms for at least several months and/or several seasons to assess the effectiveness of the new test for the wide variety of water types submitted for analysis? Recommended.	**5.1.7**	O	
Does the laboratory perform the approved methods listed in this section for the TCR, SWTR, and/or GWR?	**5.1.8**	O	
Enzyme (chromogenic/fluorogenic) substrate tests	**5.3**		
General	**5.3.1**		

ELEMENT	ITEM	Y/N/O	COMMENTS
For detecting total coliforms and E. coli in drinking water by an enzyme substrate test, does the laboratory use one of the following: MMO-MUG test (Colilert), Colisure test, E*Colite test, Readycult Coliforms 100 Presence/Absence Test, Fluorocult LMX test, or Colitag test?	5.3.1.1	Y	
For enumerating total coliforms in source waters by an enzyme substrate test, does the laboratory use the Colilert test?		O	
If a laboratory uses a fermentation method to detect total coliforms in drinking water, and the sample is total coliform-positive, does the laboratory transfer the positive culture to the EC+MUG test to detect E. coli, but not to any other enzyme substrate test medium in Section 5.3?		O	
Media	5.3.1.2		
Does the laboratory purchase media from a commercially available source only and not prepare media from basic ingredients?	5.3.1.2.1	Y	
Are media kept protected from light?	5.3.1.2.2	Y	
Is each lot of medium checked for fluorescence before use with a 365-366-nm ultraviolet light with a six watt bulb?	5.3.1.2.3	Y	
If medium exhibits faint fluorescence, is another lot used that does not fluoresce?		Y	
If samples plus medium exhibit color changes before incubation, is the medium discarded and another lot of medium used?	5.3.1.2.4	Y	
Are glass and plastic bottles and test tubes checked before use with a 365-366-nm ultraviolet light source with a 6-watt bulb to ensure that they do not fluoresce?	5.3.1.3	Y	
If they fluoresce, does the laboratory use another lot of containers that does not fluoresce?		Y	
If a Whirl-Pak7 bag is used to incubate the Colilert or Colitag medium or any other medium which changes to a yellow color to indicate a positive result, is a type used that has a barrier (e.g., B01417) to prevent gaseous emissions to other Whirl-Pak7 bags during incubation?	5.3.1.4	O	
QC If a small air-type incubator is used, are samples brought to room temperature before incubation?	5.3.1.5	Y	
If a water bath is used, is the water level above the upper level of the medium?	5.3.1.6	O	
For E. coli testing, are all total coliform-positive samples placed under a UV lamp (365-366 nm) in a darkened area?	5.3.1.7	Y	
Does the laboratory refrain from using the enzyme substrate test to confirm a presumptive total coliform-positive culture in a fermentation broth or on a membrane filter?	5.3.1.8	Y	
Does the laboratory invalidate any sample that produces an atypical color change (in the absence of a yellow color) and then collect, or request that the system collect, another sample from the same location as the original invalidated sample?	5.3.1.9	Y	
Does the laboratory use another method to test the second sample?		O	
Is the reference comparator provided by the manufacturer discarded by the manufacturer's expiration date?	5.3.1.10	Y	
Criteria for specific media	5.3.2		
For the Colilert test, are samples incubated at 35°±0.5°C for 24 hours?	5.3.2.1	Y	
Is a sample with a yellow color in the medium equal to or greater than reference comparator recorded as total coliform-positive?		Y	
Is a sample with a yellow color lighter than comparator incubated for another four hours but no longer than 28 hours total?		Y	
Is a sample with a yellow color lighter than the comparator after 28 hours of incubation recorded as total coliform-negative?		Y	
Are coliform-positive samples that fluoresce under a UV light marked as E. coli-positive?		Y	
For the Colilert-18 test, are samples incubated for 18 hours (up to 22 hours if the sample after 18 hours is yellow, but lighter than the comparator)?		O	
For enumerating total coliforms in source waters, does the laboratory use the Colilert test, a 5- or 10-tube configuration, Quanti-Tray, or Quanti-Tray 2000 for each sample dilution tested?	5.3.2.1.1	O	

ELEMENT	ITEM	Y/N/O	COMMENTS
When dilution water is used, is it either sterile deionized or sterile distilled water, not buffered water?		O	
QC If the Quanti-Tray or Quanti-Tray 2000 test is used, is the sealer checked monthly by adding a dye to the water?	5.3.2.1.2	O	
For the Colisure test, are samples incubated at 35°±0.5°C for 24-48 hours?	5.3.2.2	O	
If the medium changes from a yellow color to a red/magenta color, is the sample noted as total coliform-positive?		O	
Is a coliform-positive sample that fluoresces under a UV light marked as E. coli-positive?		O	
For the E*Colite test, is the sample incubated at 35°±0.5°C for 28 hours?	5.3.2.3	O	
If the medium changes from a yellow color to a blue or blue-green color, or a blue color in the corners of the bag, is the sample marked as total coliform-positive?		O	
If the medium fluoresces under a UV light, is the sample considered as E. coli-positive?		O	
If fluorescence is not observed, is the sample reincubated for an additional 20 hours (for a total incubation time of 48 hours) and checked again for fluorescence?		O	
If the medium becomes red in color, is the sample discarded and another sample requested?		O	
For the Readycult Coliforms 100 Presence-Absence test, are the contents of a snap pack added to a 100-mL sample and then incubated at 35°±0.5°C for 24±2 hours?	5.3.2.4	O	
If the medium changes color from a slightly yellow color to blue-green, is the sample marked as coliform-positive?		O	
If the medium fluoresces a bright light-blue color when subjected to long wave UV (365-366 nm) light, is the sample marked as E. coli-positive?		O	
For the Fluorocult LMX test, is the medium added to purified water, mixed, and the mixture then boiled to dissolve the medium completely in the water?	5.3.2.5	O	
Are 100-mL aliquots transferred to 250-mL bottles and then autoclaved for 15 minutes?		O	
Are the autoclaved bottles cooled before adding the 100-mL water sample?		O	
Is the E. coli/Coliform Supplement not added to the medium?		O	
Is the sample then incubated at 35°±0.5°C for 24±1 hours?		O	
If the medium changes color from a slightly yellow color to blue-green, is the sample marked as coliform-positive?		O	
If the medium fluoresces a bright light-blue color when subjected to long wave UV (365-366 nm) light, is the sample marked as E. coli-positive?		O	
For the Colitag test, are samples incubated at 35°±0.5°C for 24±2 hours?	5.3.2.6	O	
If the medium changes to a yellow color, is the sample marked as coliform-positive?		O	
If the medium fluoresces under a UV light, is the sample marked as E. coli-positive?		O	
EC Medium + MUG (for detection of E. coli)	5.3.3	O	
If EC medium + MUG is used, is a total coliform-positive culture transferred from a presumptive tube/bottle or colony to this medium?	5.3.3.1	O	
Is the final pH of EC medium + MUG 6.9±0.2?	5.3.3.2	O	
Is the medium plus sample incubated at 44.5°±0.2°C for 24±2 hours and then tested for fluorescence?	5.3.3.4	O	
Enterolert test (for detection of enterococci in ground water)	5.3.4	O	
Is the medium stored in the dark at 4°-30°C until used?	5.3.4.1	O	
Is Enterolert reagent added to a 100-mL sample and the sample/medium incubated at 41°±0.5°C for 24-28 hours?	5.3.4.2	O	
Is fluorescence under a UV lamp used to indicate the presence of enterococci?		O	
6. SAMPLE COLLECTION, HANDLING, AND PRESERVATION			
Sample Collector	6.1		
Is the sample collector trained in aseptic sampling procedures and, if required, approved by the appropriate regulatory authority or its designated representative?		Y	
Sampling	6.2		

ELEMENT	ITEM	Y/N/O	COMMENTS
Are the drinking water samples collected under the Total Coliform Rule representative of the water distribution system?	6.2.1	Y	
Are the water taps used for sampling free of aerators, strainers, hose attachments, mixing type faucets, and purification devices?		Y	
Are only cold water taps used?		Y	
Are service lines cleared before sampling by maintaining a steady water flow for at least 2 minutes or until a steady water temperature is reached?		Y	
Is at least a 100-mL sample volume collected, allowing at least a 1-inch air space in the container to facilitate mixing of the sample by shaking?		Y	
Is a sample information form completed immediately after sample collection?		Y	
If a sample bottle is filled too full to allow for proper mixing, is the entire sample poured into a larger sterile container and mixed before proceeding with the analysis?		O	
For the SWTR, are the source water samples representative of the source of supply and collected not too far from the intake point, but at a reasonable distance from the bank or shore?	6.2.2	O	
Is the sample volume sufficient to perform all the tests required?		Y	
For the analysis of coliphage, E. coli, or enterococci under the GWR, is at least a 100-mL sample volume collected?	6.2.3 6.2.4	O	
Sample Icing	6.3		
For drinking water bacterial samples, is the sampler encouraged to hold samples at <10°C during transit to the laboratory?	6.3.1	O	
For source water bacterial samples, are samples held at <10°C during transit to the laboratory?		O	
Does the laboratory reject samples that have been frozen?		O	
For coliphage analysis under the GWR, are samples shipped at <10°C, stored at 1° 5°C, and not frozen?	6.3.2	O	
QC For SWTR samples and coliphage samples, does the laboratory record sample temperature upon receipt?		O	
QC Does the laboratory flag samples that have a temperature upon receipt of >10°C, whether iced or not, unless the time since the sample collection is less than two hours?		O	
Sample Holding/Travel Time	6.4		
For the analysis of total coliforms in drinking water, does the time between sample collection and placement of the sample in the incubator not exceed 30 hours?	6.4.1	Y	
Are all samples analyzed on the day of receipt?		Y	
Are samples received late in the day refrigerated overnight only if analysis can begin within 30 hours of collection?		O	
For total coliforms and fecal coliforms in surface water sources, and for heterotrophic bacteria in drinking water, is the time from sample collection to placement in the incubator less than eight hours?	6.4.2	O	
For coliphage analysis, is the time from sample collection to placement of sample in the incubator less than 48 hours?	6.4.3	O	
For coliphage analysis, is the time from sewage sample collection to analysis of QC spiking suspension less than 24 hours, unless re-titered and the titer has not decreased by more than 50%?		O	
If the titer has not decreased by more than 50%, is the sample stored no longer than 72 hours?		O	
For E. coli and enterococci analysis under the GWR, is the time between sample collection and the placement of sample in the incubator less than 30 hours?	6.4.4	O	
Sample Information Form	6.5		
After collection, does the sampler enter the following information in indelible ink on sample information form?		N	
- Name of system (PWSS identification number if available)		Y	
- Sample identification (if any)		Y	
- Sample site location		Y	
- Sample type (e.g., a routine distribution, repeat, raw or process, or other special purpose)		Y	

ELEMENT	ITEM	Y/N/O	COMMENTS
- Date and time of collection		Y	
- Analysis requested		Y	
- Disinfectant residual		Y	
- Name of sampler		Y	
Any remarks		Y	
Chain-of-Custody	**6.6**		
Are applicable State regulations pertaining to chain-of-custody followed by sample collectors and the laboratory?		Y	
7. QUALITY ASSURANCE			
Does the laboratory have a written QA Plan prepared and available for inspection?	**7.1**	Y	
Does the laboratory follow the written QA Plan?		Y	
Does the laboratory have a Standard Operating Procedure available for review pertaining to its own calibration of equipment or supplies?		Y	
Does the laboratory successfully analyze at least one set of PT samples once every 12 months for each method for which it is certified?	**7.2**	Y	
For methods used to test the presence or absence of an organism in a sample, does the laboratory analyze each PT sample set using a single analytical method only?		Y	
8. RECORDS AND DATA REPORTING			
Legal Defensibility	**8.1**		
Are compliance monitoring data being maintained by the laboratory both thorough and accurate, and thus legally defensible?		Y	
Does the laboratory's QA plan and/or SOPs describe the policies and procedures used by the facility for record retention and storage?		N	
If samples are expected to become part of legal action, does the laboratory follow chain-of-custody procedures?		Y	
Maintenance of Records	**8.2**		
Does the public water system maintain records of microbiological analyses for five years?		Y	
Does the laboratory maintain easily accessible records for five years or until the next certification data audit is completed, whichever is longer?		Y	
Does the laboratory notify the client water system before disposing of records so they may request copies if needed?		O	
Does the laboratory backup all electronic data by protected tape, disk, or hard copy?		Y	
When the laboratory changes its computer hardware or software, are provisions in place for transferring old data to the new system so that data remain retrievable within the specified time frames?		Y	
Sampling Records	**8.3**		
Are all data recorded in ink, with any changes lined through such that the original entry is visible?		N	
Are changes initialed and dated?		N	
Does the laboratory have the following sample information readily available?	**8.3.1-4**		
- Date and time of sample receipt by the laboratory		Y	
- Name of the laboratory person receiving the sample		Y	
- Information on any deficiency in the condition of the sample		Y	
Are samples invalidated for the following reasons?	**8.3.4**		
- Time between sample collection and receipt by laboratory exceeded		Y	
- Presence of disinfectant in sample noticed, e.g., odor		Y	
- Evidence of freezing		Y	
- Use of a container not approved by the laboratory for the purpose intended		Y	
- Insufficient sample volume, e.g., <100 mL		Y	
- Presence of interfering contaminants noticed, e.g., hydrocarbons, cleansers, heavy metals, etc.		Y	
- Sample temperature exceeding the maximum allowable		Y	
Analytical Records	**8.4**		
Are all recorded data in ink with any changes lined through such that original entry is visible?		N	
Are these changes initialed and dated?		N	

ELEMENT	ITEM	Y/N/O	COMMENTS
Are the following readily available?	8.4.1-6		
- Laboratory sample identification information		Y	
- Information concerning date and time analysis begins		Y	
- Name of the laboratory and a signature or initials of the person(s) performing analysis		Y	
- Information concerning the analytical technique or method used		Y	
- Information concerning all items marked "QC"		Y	
- Results of the analyses		Y	
Preventive Maintenance	8.5		
Does the laboratory maintain preventive maintenance and repair records for all instruments and equipment?		N	
Are these records kept for five years in a manner that allows for easy inspection?		N	
9. ACTION RESPONSE TO LABORATORY RESULTS			
Testing Total Coliform-Positive Cultures	9.1		
For the Total Coliform Rule, does the laboratory test all total coliform-positive cultures for the presence of either fecal coliforms or E. coli?		Y	
Notification of Positive Results	9.2		
For Total Coliform Rule, does the laboratory promptly notify the proper authority of a positive total coliform, fecal coliform, or E. coli result, so that appropriate follow-up actions can be conducted?	9.2.1	Y	
For the Total Coliform Rule, if a sample is fecal coliform- or E. coli-positive, does the system notify the State as soon as it is notified of the test result, i.e., at the end of that day or, if the State office is closed, by the end of the next business day?	9.2.2	Y	
Does the laboratory base a total coliform-positive result on the confirmed phase if the Multiple Tube Fermentation Technique or Presence-Absence Coliform Test is used, or the verified test for the Membrane Filtration Technique if M-Endo medium or M-Endo LES agar is used?	9.2.3	O	
If a presumptive total coliform-positive culture does not confirm/verify as such, but is found to be fecal coliform or E. coli-positive, is the sample considered total coliform-positive and fecal coliform/E. coli-positive?		O	
Notification of Total Coliform Interference	9.3		
For the Total Coliform Rule, does the laboratory promptly notify the proper authority when results indicate non-coliforms may have interfered with total coliform analysis?		O	

TOTAL ITEMS REVIEWED: 151

NUMBER OF ITEMS MEETING THE MINIMUM REQUIREMENTS: 137

NUMBER OF ITEMS NOT IN COMPLIANCE WITH MINIMUM REQUIREMENTS: 14

LABORAORY SCORE: 91%

Corrective action Report from WV AW (EPA obs. on-site inspection)

STATE OF WEST VIRGINIA
DEPARTMENT OF HEALTH AND HUMAN RESOURCES
ENVIRONMENTAL MICROBIOLOGY

Joe Manchin III
Governor

FACSIMILE TRANSMITTAL SHEET

DATE: November 28, 2006

NUMBER OF PAGES: 11
(INCLUDING COVER)

☐ **PRIORITY** ☑ **ROUTINE**

TO:

NAME: Joe Slayton
COMPANY: U.S.E.P.A. – Region 3
FAX NO: 410-305-3095

FROM:

NAME: Thomas L. Ong, Microbiologist Supervisor
Laboratory Evaluation Officer

SUBJECT:

Response and Corrective Actions form WVAW – Kanawha Valley Treatment Plant

COMMENTS:

BUREAU FOR PUBLIC HEALTH
OFFICE OF LABORATORY SERVICES
167 – 11th Avenue
South Charleston, WV 25303-1137

Phone: (304) 558-3530 Ext. 2710 FAX: (304) 558-2006

West Virginia American Water
Kanawha Valley District
P.O. Box 1906
Charleston, WV 25327

West Virginia American Water

October 9, 2006

Tom Ong
Bureau of Public Health
Office of Laboratory Services
167 11th Avenue
South Charleston, WV 25303-1137

OCT 13 RECD

Dear Tom:

This letter is in response to your On-Site Evaluation of the Kanawha Valley Treatment Plant on September 21, 2006. Each deviation is listed below with the corrective actions taken.

Item 2.0:

Bleach was purchased locally and is currently being used for disposal of all positive colilert samples.

Item 3.1.4:

Although the pH meter was being calibrated using three standards, we will incorporate the sheet provided by your office and begin recording the appropriate readings. A copy of a retest of TSB has been entered and is attached.

Item 3.3.2:

Using the form provide by you we will record the NBS thermometer SN#. Please find attached updated sheet.

Item 3.14.2:

A certified 100 ml (TD) graduated cylinder is available for measurement and verification of sample bottle volumes, Sample bottles are spot checked upon receipt. A copy of the form with results from the last lot purchased has been included.

Item 5.1.3:

A written procedure has been posted in the laboratory and incorporated in the Laboratory's QA/QA manual.

Item 5.1.5:

A sample bottle marked to 97.5 mls and 110 mls has been placed in the lab for comparison with samples received. This bottle will serve as a comparator. Samples exceeding 110 mls will be handled as per instructions outlined in Item 5.1.3, while samples with less than 97.5 mls will be rejected and resampled.

Item 6.5:

All samplers have been instructed to complete chain of custodies in ink.

Item 8.1:

The QC/QA manual has been updated to describe how records are to be stored and how long records are to be retained. .

Item 8.3:

All samplers have been instructed that all chain of custodies are to filled out in ink and changes are to be made by lining through with ink, initialed and dated.

Item 8.4:

In order to facilitate the use of ink pens, two ink pens will be stationed in close proximity of the records and log in computer.

Item 8.5:

Following the inspection, maintenance logs were found. A copy of the log is attached.

If you have any further questions, please feel free to contact me.

Sincerely,

David Peters
Water Quality Supervisor

3.1.4

TRYPTIC SOY BROTH – COMMERCIALLY PREPARED – QUALITY CONTROL

pH Meter Calibration						Tryptic Soy Broth – pH Verification & Productivity Controls										
Date	Analyst	pH 4.00	pH 7.00	pH 10.00	Slope	Date Received	Manufacturer	Lot #	pH	Date Incubated	Analyst	Positive Control 24 Hr	Positive Control 48 Hr	Sterility Control 24 Hr	Sterility Control 48 Hr	Comme
9/25/06	SS	4.01	6.99	10.01	98.3	8/4/06	BBL	6099641	7.18	9/25/06	DCP	+	+	–	–	

3.3.2

THERMOMETER CALIBRATIONS

Test Thermometer S/N:	± 97-565	LAB ID:	
Thermometer Location:	Bacteria Lab		

Date	Analyst	Certified Thermometer S/N	Certified Reading °C	Test Reading °C	Correction Factor °C	Comments
8/10/2006	JJ	2705	3.8	3.8	±0.0	
↓	↓	60324	3.6	3.8	+0.2	
		60320	3.7	3.8	+0.1	
		4994	3.5	3.7	+0.2	
↓	↓	5559	4.0	3.7	-0.3	
9/8/06	JJ	5542	35.4	35.5	+0.1	
↓	↓	5536	35.4	35.5	+0.1	
↓ 9/11/06	↓	6469	34.9	35.1	+0.2	

,14,2

[illegible] BOTTLES – QUALITY CONTROL

1. STERILITY: Add 25 mLs of Trypticase Soy Broth to each of 20 Bottles and incubate for 48 ± hours @ 35.0 ± 0.5 °C. Check for Growth in 24 and 48 hrs. Report No Growth as "(# of Bottles) A". Report Growth as "(# of Bottles) P". If any show growth, repeat test. If repeat test shows growth reject lot and contact manufacturer.
2. AUTOFLUORESCENCE: Check 1 bottle with a 6 watt 366 nm UV light. Record Autofluorescence as "NO" or "YES". If "YES", contact manufacturer.
3. 100 mL VERIFICATION: Fill bottle to 100 mL line with water. Measure volume with a Graduated Cylinder and record volume.

DATE REC'D	LOT #	DATE EXAM'D	STERILITY "#P" OR "#A" 24 Hr	48 Hr	AUTO-FLUORESCENCE	100 mL VERIFICATION	COMMENTS	ANALYST INITIALS
8/21/06	CB615	8/21/06	20 A	20A	No	~~100 mL~~ JJ		DCP
8/2[illegible]/06	CB615	9/28/06				100 mL		JJ

Procedure for Handling Bacteriological Samples

1. **Any sample not containing 97.5 mls (to be determined by use of the laboratory comparator) should be discarded and resampled.**
2. **Should a sample exceed 110 mls (to be determined by use of the laboratory comparator) the following procedure is to be used.**

- **Shake sample 25 times (within 7 seconds with a 1 foot movement).**
- **Remove excess sample by pouring off or by sterilized pipet.**

8.1

VIII. QUALITY ASSURANCE

Written QA Plan prepared, followed, and available for inspection.

IX. RECORDS AND DATA REPORTING

1. Legal Defensibility

Compliance monitoring data legally defensible by keeping thorough and accurate records

QA Plan and/or SOP's describe policies and procedures used by facility for record retention and storage in bound notebooks and filed in boxes.

Chain-of-Custody procedures used if samples expected to become part of legal action.

2. Maintenance of Records

Microbiological records kept by or accessible to laboratory for at least 10 years or until next certification data audit completed, whichever is longer.

Client water system notified before disposal of records.

X. MISCELLANEOUS

1. Mandatory-must analyze Performance Evaluation (PE) Samples purchased from a NIST Certified PE Sample Provider and conform to EPA WSMICRO standards.

One set of PE samples for each analytical test method that you are certified for. EACH TEST METHOD MUST BE ANALYZED WITH A DIFFERENT SET OF PE SAMPLES (DIFFERENT STUDY/DIFFERENT LOT NUMBERS).

Official report must be sent from accrediting authority directly to Office of Laboratory Services.

8.5.

West Virginia--American Water

Kanawha Valley Laboratory

Equipment Inspection and Maintenance Record

Equipment: Incubator	Location: Bacteria Lab
Model #/Type: 180 [illegible]	Serial #: SO 92/05/124
Manufacturer: Gallen - Kamp	Safety Precautions:
In Service Date: 1992	Out of Service Date:
Additional Information:	

Maintenance

Date	Type of Maintenance	Initials
2/2004	Cleaned	CAT
9/5/2006	Replaced Thermometers	JF

8.5

West Virginia--American Water

Kanawha Valley Laboratory

Equipment Inspection and Maintenance Record

Equipment: Refrigerator	Location: Bacteria Lab
Model #/Type: Isc-Temp	Serial #: 73-986-2336
Manufacturer: Isc-Temp Fisher	Safety Precautions:
In Service Date: 8/9/99	Out of Service Date:
Additional Information:	

Maintenance

Date	Type of Maintenance	Initials
5/2002	Maintenance of door molding replaced	JS

85

West Virginia--American Water

Kanawha Valley Laboratory

Equipment Inspection and Maintenance Record

Equipment: pH	Location: Operator's lab
Model #/Type: Orion 720A	Serial #: 29192
Manufacturer: Orion / Thermo	Safety Precautions:
In Service Date: 11/2005 - re-introduced	Out of Service Date:
Additional Information: purchased in 1992	

Maintenance

Date	Type of Maintenance	Initials
11/2005	Put back in service	JS
11/2005	New probe model 810 13WU	JS

WEST VIRGINIA
DEPARTMENT OF HEALTH AND HUMAN RESOURCES
OFFICE OF LABORATORY SERVICES
ENVIRONMENTAL CHEMISTRY LABORATORY

4710 CHIMNEY DRIVE SUITE G
CHARLESTON, WEST VIRGINIA 25302
PHONE NUMBER: 304-965-2694 FAX: 304-965-2696

Fax

To:	Joe Slayton Environmental Science Center Fort Meade, MD	**From:**	Larry A. Duffield
Fax:	410-305-3095	**Pages:**	23
Phone:		**Date:**	12/7/06
Re:		**CC:**	

☐ Urgent ☒ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

• **Notes/Comments:**

West Virginia Department of Health and Human Resources
Bureau for Public Health
Office Laboratory Services
Environmental Chemistry Section

Standard Operating Procedure

Turbidity
by
Nephelometery
Following
EPA Method 180.1 Revision 2

Prepared by: Gregory W Young — Date: 12/7/06
Gregory Young, Chemist II

Reviewed by: Larry A Duffield — Date: 12-7-06
Larry A. Duffield, Program Manager

Approved by: _____ Date: _____
Dr. Andrea Labik, Laboratory Director

Periodic Review:

Signature	Title	Date

Project # Name:	SOPWET01000
Revision #:	2
Date:	December 2006
Page:	1 of 11

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Turbidity Drinking Water Measured in NTU's

EPA method 180.1 Revision 2 Determination of Turbidity by Nephelometery

1. Introduction

Turbidity is the measurement of the clarity of water in nephelometric turbidity units (NTUs). This measurement is based upon the scattering effect suspended particles have in water when a light source is directed through it. Turbidity itself is not a major health concern, but high turbidity can interfere with the disinfection process and support growth of harmful microorganisms.

2. Theory of Operation

The simplest form of a turbidity meter is a path of light that is directed through a water sample and the light scattered by the suspended particles is measured by a detector. As EPA tightened drinking water regulations a reliable measurement of turbidity was required and the design of today's turbidity meter was developed by the Office of Ground Water and Drinking Water.

The light source installed on the Hach 2100N meter is a Tungsten-filament lamp which is sensitive to small particles; however water tint/color typically interferes. The light is directed towards the sample by the means of a blue infrared filter (400nm to 600nm) and lens. As the path length is increased the instrument becomes sensitive to small particles. By reducing the path length the linear response of the instrument is broader. To increase sensitivity and still maintain a linear response, a path length of less than 10cm total (measured from the lamp filament to the detector) in instrument design is required. As the light strikes the suspended particles it is redirected due to the size, shape and composition of the particles, and by the tint/color of the water. This scattering of light is measured by the detector. The measurement of the scattered light is done at a right angle to the light path. If the detector were placed directly in the path length the amount of scattered light from small particles would be virtually impossible to detect due to the background light.

3. Sample Precautions

3.1. Sample Collection

A majority of the samples received in the laboratory are collected in a 1-liter plastic "mini milk jug" bottle by sanitarians or district engineers. When a sample kit is sent to an individual the appropriate sampling instructions are included.

3.2. Sample Preservation

The sample must be chilled on ice at 4±2°C or less at the time of collection and maintained until analysis. No other preservation is required.

3.3. Sample Storage

Store samples at 4±2°C or less until analyzed. A refrigerator is located in the inorganic, wet chemistry laboratory for sample storage. Samples must be analyzed within 48 hours of sample collection.

3.4. Sample Rejection

Any regulatory compliance monitoring sample will be rejected for any of the specific reasons listed below that are not covered in the Environmental Chemistry Quality Assurance Manual.

3.4.1. Sample exceeded holding time.
3.4.2. Temperature was not maintained or sample is frozen.
3.4.3. Sample was collected in a bottle not issued by the laboratory.
3.4.4. Sample volume was less then 500ml.
3.4.5. For samples intended as evidence in litigation, Chain-of Custody Form not maintained

4. Equipment, Reagents and Supplies

All solutions must be recorded in the Wet Chemistry Standards and Reagents Tracking Log.

4.1 Equipment

4.1.1. Hach model 2100N turbidimeter with a Kyoline printer.
4.1.2. Refrigerator capable of 4±2°C or less with a calibrated thermometer on both the upper and lower shelves.

4.2 Reagents

4.2.1. Alconox cleaning compound
4.2.2. Reagent water – free from analytes of interest.
4.2.3. Stock Formazin 4000NTU Standard
4.2.4. Calibration Standards – prepared day of use

Calibration Standard	Stock Formazin (ml)	Final Volume (ml)
0.0 NTU	----	100
20 NTU	500 µl	100
200 NTU	5 ml	100
1000 NTU	25 ml	100
4000 NTU	-----	-----

4.2.5. Calibration Verification Standards – prepared day of use

Calibration Standard	Stock Formazin (ml)	Final Volume (ml)
0.50 NTU	25 µl	200
10 NTU	250 µl	100
20 NTU	500 µl	100
30 NTU	750 µl	100
40 NTU	1000 µl	100

4.3. Supplies

4.3.1. Cuvettes
4.3.2. Kimwipes
4.3.3. Alcohol pads
4.3.4. 1 liter plastic "mini milk jug"
4.3.5. 100ml and 200 ml class A volumetric flask

5. Initial Demonstration of Capability

Before an analyst can analyze drinking water regulatory compliance monitoring samples an Initial Demonstration of Capability (IDC) must be completed and reviewed by the Program Manager and placed in the analyst IDC folder.

5.2. Method Detection Limit

5.2.1. Method detection limit (MDL) is the minimum concentration of an analyte that can be identified with 99% confidence that the analyte concentration is greater then zero.

5.2.2. The FRW must be exposed to the entire sample handling and preparation scheme.

5.2.3. The MDL is determined by analyzing seven replicates of fortified reagent water (FRW), which has concentration equal to the Minimum Reporting Limit.

5.2.4. MDL = 3.14 x (standard deviation of the seven replicates).

5.2.5. Determined annually or when major instrument maintenance is needed or new analyst.

5.3. Method Precision and Accuracy

5.3.1. The analyst must demonstrate the ability to achieve the precision and accuracy required by the method and/or program.

5.3.2. The solution used in determining the method precision and accuracy is a sample matrix containing method analyte of known concentration in water, which is used to fortify reagent water of environmental samples.

5.3.3. The solution must be obtained from a source different from the laboratory calibration standards. The solution must be treated like a sample and processed through the entire analytical preparation scheme.

5.3.4. The Quality Control Providers acceptance limits must be adhered to, if no limits are provided then the recovery must fall within 90 – 110% of the true value. If recovery of the analyte exceeds the control limit corrective action must be taken and documented.

5.3.5. A minimum of four replicates must be analyzed to determine precision. The Relative Standard Deviation (RSD) must be ≤10%. If the RSD exceeds the control limits corrective action must be taken.

5.3.6. The true value and source of the solution used in determining precision and accuracy must be recorded in the workbook.

5.4. Determination of Unknown

5.4.1. The determination of the unknown sample demonstrates the analyst is capable of meeting all the requirements listed in the EPA certification manual, method specific requirements, and this standard operating procedure.

5.4.2. The unknown sample may be a drinking water proficiency testing sample or a purchased quality control sample.

5.4.3. The unknown sample must be treated like a sample and prepared through the entire analytical process.

5.4.4. The true value of the quality control sample must be unknown to the

analyst performing the analysis.

5.4.5. The control limits listed in the SOP for the Quality Control Sample (section 6.1) must be applied when calculating the percent recovery. If a drinking water proficiency testing sample is used as the unknown then the acceptance limits of the study must be applied.

6. Quality Control

6.1. Quality Control Sample

6.1.1. A Quality Control Sample (QCS) is a sample matrix containing method analyte or a solution of the method analyte in a water miscible solvent, which is used to fortify reagent water or environmental samples.

6.1.2. Should be obtained from a source external to the laboratory.

6.1.3. Should be of a different source than that of the calibration or stock solutions.

6.1.4. Analyzed at least once per quarter and/or with each batch.

6.1.5. The Quality Control Providers acceptance limits must be adhered to, if no limits are provided then the recovery must fall within 90 – 110% of the true value. If recovery of analyte exceeds a control limit, corrective action must be taken and documented in log book. Calibration standards and sample must be reanalyzed if limits are exceeded on second analysis.

6.2. Laboratory Reagent Blank

6.2.1. Laboratory reagent blank (LRB) is reagent grade water treated exactly as a sample to assess contamination from the environment.

6.2.2. LRB must be analyzed with every batch of samples.

6.2.3. The LRB is made by filling a sample bottle with reagent water.

6.2.4. Corrective action should be taken and documented if the value exceeds the MDL. Calibration standards and sample must be reanalyzed if results are exceeded on second analysis

6.3. Laboratory Fortified Blank

6.3.1. Laboratory fortified blank (LFB) is a known quantity of the method analyte added to reagent water in the laboratory. This is used to verify the complete laboratory analysis procedure from sample preparation to analysis. The concentration should be same as the concentration used in spiking the laboratory fortified sample matrix.

6.3.2. LFB must be analyzed with each batch of sample.

6.3.3. The LFB is prepared by transferring 0.5ml of the Stock 4000 NTU Formazin solution to a class A 100 ml volumetric flask and filling to the mark with the LRB solution. The LFB concentration will be 20 NTU.

6.3.4. Control limit for the LFB recovery are 90 to 110%. If the recovery of the analyte exceeds control limit corrective action must be taken and documented. Calibration standards and sample must be reanalyzed if results are exceeded on second analysis.

6.3.5. The results from the LFB must be graphed.

6.4. Instrument Performance Check Solution

6.4.1. Instrument Performance Check Solution (IPC) is a known quantity of the

method analyte added to reagent water in the laboratory. This solution is used in assessing the performance of the instrument.

6.4.2. IPC must be analyzed immediately following the calibration curve, after every tenth sample and at the end of the run.

6.4.3. The IPC is the 20 NTU calibration standard.

6.4.4. Control limits for the IPC recovery are 90 to 110%. If the recovery of the analyte exceeds a control limit, corrective action must be taken and documented. Calibration standards and sample must be reanalyzed if results are exceeded on second analysis.

6.5. Quality Control Blank

6.5.1. The Quality Control Blank (QCBlank) is analyzed reagent water. The purpose of the QCBlank is to monitor instrument drift.

6.5.2. QCBlank must be analyzed immediately following the calibration curve, after every tenth sample and at the end of the run.

6.5.3. The QCBlank is prepared in the same manner as the calibration blank used in developing the daily calibration curve.

6.5.4. Corrective action should be taken and documented if the QCBlank reading is greater then 0.05 NTU. Water is considered particle free when the NTU is ≤ 0.05. See Reference Section 11.3, page 44.Calibration standards and sample must be reanalyzed if results are exceeded on second analysis.

6.6. Minimum Reporting Limit

6.6.1. The Minimum Report Limit (MRL) is reagent water spiked with a concentration of analyte that is equal to the lowest reportable value of the instrument. This is used to verify the laboratory's reporting limit.

6.6.2. The MRL must be analyzed with each daily (or batch) analysis.

6.6.3. The MRL concentration is 0.50 NTU and is prepared by transferring 25µl of the 4000 NTU Formazin standard to a 200ml class A graduated flask, dilute to the 200ml mark with reagent water.

6.6.3. Control limits for the MRL recovery are 70 to 130%. If the recovery of the analyte exceeds a control limit, corrective action must be taken and documented. Calibration standards and sample must be reanalyzed if results are exceeded on second analysis.

6.7. Duplicate

6.7.1. Analysis of duplicate samples is effective for assessing method precision.

6.7.2. Analyze 5% or more of the samples in duplicate.

6.7.3. Relative percent difference must be ≤10%. If the relative percent difference exceeds control limits corrective action must be taken. Calibration standards and samples must be reanalyzed if results are exceeded on second analysis.

6.8. Corrective Action Log Book

When a result is outside the acceptable limits established for a quality control parameter the resulting failure must be documented in the Corrective Action Logbook.

7. Procedure

7.1. Glassware Preparation

7.1.1. All glassware must be scrupulously cleaned and rinsed with reagent grade water.

7.1.2. Between samples the beaker must be rinsed with reagent grade water.

7.1.3. There is no clean up of the sample container; these are disposable.

7.2 Sample Preparation

7.2.1. Remove sample from the storage refrigerator and allow to equilibrate to room temperature.

7.2.2. Invert sample several times to insure proper mixing and transfer a sample aliquot to a scratch free indexed cuvette used to calibrate the turbidity meter.

7.3 Analysis

7.3.1 Turn on the turbidity meter and allow 3 hours to equilibrate. An EPA Filter Assembly provided by the manufacturer is required to report compliance results. Inspect the filter lens to ensure it is free of any blemishes. Hold the tab of the filter assembly so the arrows located on top is pointing toward the front of the turbidity meter and slowly insert the filter into the back rectangular housing of the sample analysis compartment.

7.3.2. Touching only the top portion of the cuvette rinse the cuvette with three overlapping rinses of reagent water starting at the top of the cuvette and working down the interior side walls. Shake the cuvette to remove as much reagent water as possible.

7.3.3. Fill the cuvette with reagent water to the fill mark while limiting the amount of bubbles formed. Using an alcohol swab wipe the exterior of the cuvette to eliminate all fingerprints, then dry using a lint free Kimwipe.

7.3.4. Open the sample compartment door and place the cuvette inside the optics tube, making sure to align the index marks. To remove interference from excess light, close the sample compartment door.

7.3.5. Allow the standard to equilibrate for 1 minute and then press the **CAL** button. Notice the **S0 calibration light** is flashing and the meter is displaying the previous NTU value. Press the **ENTER** button and the meter will wait 60 seconds and take a reading.

7.3.6. After the reading is completed the meter will advance to the next standard **S1** and will display the expected NTU value. See section 10.3 if the NTU displayed is not correct. Clean the cuvette following the directions in 7.3.2. Touching only the top portion of the cuvette fill it to mark with the next calibration standard while limiting the amount of bubbles formed. Wipe the exterior with an alcohol swab to eliminate all fingerprint, then dry using a lint free Kimwipe. Allow the standard to equilibrate for 1 minute while the S1 indicator flashes. Press the **ENTER** button and the meter will take a reading in 60 seconds.

7.3.7. After reading is completed proceed to the next NTU calibration standard and follow the above steps in 7.3.6.

7.3.8. After the turbidity meter is calibrated press the **CAL** button to save the newly developed calibration curve. The new calibration curve is required every three months. To *print* the stored calibration curve press the **CAL** button followed by the **PRINT** button. After printing is completed press the **UNITS/Exit** Button to exit.

7.3.9. After the turbidity meter is calibrated, verify the calibration by analyzing the Calibration Verification Standard (section 4.2.5). If all the recoveries for each standard are within 100±10% of the prepared value, then all samples and quality controls can be analyzed. Allow all samples and quality controls to equilibrate for 2 minutes before taking a reading by pressing the **PRINT** button.

8. Data Analysis and Calculations

8.1. Calculations

8.1.1. Using a calculator based regression curve fitting technique plot the concentration values (x axis) against the instrument response (y axis). This is done by the Hach 2100N Turbidity Meter.

8.1.2. Sample concentration is calculated by comparing sample response with the standard curve. The meter performs this task and displays the sample NTU measurement.

8.1.3. The Calibration Curve is deemed acceptable if all Calibration Verification Standard recoveries are within 100±10% of the prepared value.

8.2. Data Analysis

8.2.1. All information must be recorded in the laboratory notebook. This should include the analyst initials, date and time of analyses, concentration values of calibration standards, sample identification number along with calculated concentration, percent recoveries of spikes and quality control samples, relative percent difference of duplicate and true value of quality control sample along with the lot number and correlation coefficient.

8.2.2. Report only those values that fall between the Reporting Limit Verification Standard and the highest calibration standard. Samples that exceeded a NTU of 40 must be diluted below 40 NTU and reanalyzed.

8.2.3. When a sample is analyzed in duplicate the initial results is reported and the second result is for the determination of method precision only.

8.2.4. Report results using the correct number of significant figures (3).

8.2.5. Samples that are below the Reporting Limit Verification Standard are reported as <0.5NTU.

8.2.6. Samples results that exceeded the maximum contaminant level must be reviewed and initialed by a 2nd analyst.

9. Safety Preparations

9.1 Protective Equipment

9.1.1. Safety precautions must be taken when handling acids, reagents and samples. Protective clothing including lab coats, safety glasses and gloves should be worn. Contact lenses must not be worn.

9.2 Chemicals

9.2.1. All spills should be reported to the supervisor as soon as possible.

9.2.2. If solutions come into contact with your eyes, flush with cold water continuously for 15 minutes. If solutions come in contact with your skin, was thoroughly with soap and water.

9.2.3. MSDS sheets are located in the wet chemistry laboratory inside the Material Safety Data Sheet binder.

9.2.4. Stock Formazine contains Hydrazine Sulfate which is a carcinogen. Follow the MSDS for required personal protection equipment and disposal.

10.Procedure Notes

10.3. To change the Calibration Standard NTU displayed on the meter follow the directions in section 3.3.2. of the Hach Model 2100N Laboratory Turbidimeter Instruction Manual.

10.4. All instrument upkeep must be recorded in the Instrument Maintenance Log Book. The analyst should include a brief description of the maintenance performed and date completed.

11. Reference

11.1. EPA Method 180.1 Revision 2, Determination of Turbidity by Nephelometery, Methods for the Determination of Inorganic Substances in Environmental Samples EPA/600/R-93/100

11.2. "Manual for The Certification of Laboratories Analyzing Drinking Water" 5th Edition, January 2005, EPA 815-R-05-004

11.3. "Model 2100N Laboratory Turbidimeter Instruction Manual", 1999, P.O. Box 389, Loveland, Colorado 80539-0389

11.4. WVDHHR – OLS – Quality Assurance Manual for Environmental Chemistry and Microbiology Laboratories

Appendix A

Quality Control Limits and Corrective Action Summary

Quality Control Parameter	Turbidity	Frequency
Calibration Verification Standards	100 ± 10% REC.	After Calibration
Corrective Action: Recalibrate instrument. If continued failures review instrument operating manual trouble shooting section.		
Quality Control Sample (QCS)	Provider Acceptance Limits not provided 100 ± 10% REC.	Each Run
Corrective Action: Repeat. Upon second failure stop analysis and determine cause. If found necessary prepare a new QCS.		
Laboratory Reagent Blank (LRB)	< MDL	Each Run
Corrective Action: Repeat until second failure. Upon second failure stop analysis and determine source of contamination and eliminate.		
Laboratory Fortified Blank (LFB)	100 ± 10% REC.	Each Run
Corrective Action: Repeat until second failure. Upon second failure stop analysis and determine cause of analyte lose or source of contamination and eliminate. If found necessary prepare a new LFB		
Minimum Reporting Limit (MRL)	100 ± 30% REC.	Each Run
Corrective Action: Repeat. Upon second failure stop analysis and determine cause. If the MRL fails often, consider raising the concentration.		
Instrument Performance Check (IPC)	100 ± 10% REC.	Beginning / Every 10th Sample / End
Corrective Action: Repeat. Upon second failure stop analysis and recalibrate instrument and reanalyze all from back to last acceptable QCS.		
Quality Control Blank (QCBlank)	≤ 0.05 NTU	Beginning / Every 10th Sample / End
Corrective Action: Repeat. Upon second failure stop analysis and determine source of instrument drift or contamination.		
Duplicate (DUP)	≤ 10% RPD	Each Run
Corrective Action: Repeat analysis, Upon second failure stop analysis and determine source causing inconstancy		

REC = Analyte Recover
RPD = Relative Percent Difference
MDL = Method Detection Limit

RECORD ALL QUALITY CONTROL PARAMETERS IN THE QUALITY CONTROL WORKSHEET LOGBOOK AND FAILED PARAMETERS IN THE CORRECTIVE ACTION LOGBOOK.

Project # Name:	SOPWET01000
Revision #:	2
Date:	December 2006
Page:	11 of 11

METHOD DETECTION LIMIT
Analyst Summary

Study Number: MM-1 Analyte: TURBIDITY

Method: 180.1 Analyst: MAM

SOP Number Revision: 2.0 Date Completed: 12-1-06

Instrument Name and Model Number: HACH 2100N TURBIDIMETER

Instrument Software Version: KYOSHA CO29.k5

Reason for Study: NEW EMPLOYEE

Source of Calibration Standard (Name / Lot#): W072 APHA /LOT NO. 6090118

Quality Control Sample (Name / Lot#): EPA WS-040

FRW Concentration in mg/L: 0.504 NTU

Student t Value: 3.14

Date FRW mix was Made: 11/30/06 3:00PM

Date of Analysis	Mean of 7 replicates	Standard Deviation	%RSD	MDL
12-1-06	0.433 NTU	0.0133	3.07	0.417

Martha A. McElfresh
Analyst's Name (print)

12-1-06
Date of Analysis

Martha A McElfresh
Analyst's Signature

12-7-06

EPA METHOD 180.1
MDL STUDY

Date:	12/1/2006	Initials:	MAM	Time:	12:30
Lot/Tracking Numbers		Calibration Standards	NTU	Reported Value	Percent Recovery
		0.0 NTU	0.030		
W072		20 NTU	20.0		
		200 NTU	200.0		
		1000 NTU	1000.0		
		4000 NTU	4000.0		
Lot/Tracking Numbers		Samples	NTU	Reported Value	Percent Recovery
W072		CVS-0.5 NTU	0.538	0.54	108
W072		CVS-10 NTU	10.1	10.10	101
W072		CVS-20 NTU	20.5	20.50	103
W072		CVS-40 NTU	40.6	40.60	102
		QC Blank	0.028	0.03	
W072		LFB	20.4	20.40	102
		LRB	0.035	0.04	
WS040		QCS-WS040 TV-7.81	9.00*	9.00*	115
W072		FRW-1	0.436	0.44	
W072		FRW-2	0.428	0.43	
W072		FRW-3	0.431	0.43	
W072		FRW-4	0.434	0.43	
W072		FRW-5	0.466	0.47	
W072		FRW-6	0.432	0.43	
W072		FRW-7	0.429	0.43	
W072		IPC-20 NTU	20.2	20.20	101
		QC Blank	0.034	0.03	
		Std. Deviation:	0.0133		
		Mean:	0.433		
		RSD:	3.067		
		MDL:	0.0417		
		FRW Concentration:	0.504 NTU		
*QCS Acceptance Range: 7.00-9.67 NTU from WS040 Study			Student t Value:3.14		

C:\Documents and Settings\ms249b\Desktop\2006 MDL STUDIES\Martha\TURBIDITY MDL2006

12-1-06 1230 MDM

EPA Method 180.1
Turbidity
MDL Study

CALIBRATION DATA
UNITS: NTU
STANDARDS:
00 0.0303
01 20.000
02 200.00
03 1000.0
04 4000.0
COEFFICIENTS:
A0=569.75960
B0=0.0020734
B1=0.0006453
C0=0.0019995
C1=0.0007964
C2=-0.000175

Calibration

0.538 NTU CVS-1

10.1 NTU CVS-2

20.5 NTU CVS-3

40.6 NTU CVS-4

0.028 NTU QC Blank

20.4 NTU LFB

0.035 NTU LRB

~~16.4 NTU~~ ~~Def~~ Defective run

9.00 NTU WS-40 7.80 NTU T.V.

0.436 NTU FRW-1 0.504 NTU T.V.

0.428 NTU FRW-2

0.431 NTU FRW-3

0.434 NTU FRW-4

0.466 NTU FRW-5

0.432 NTU FRW-6

0.429 NTU FRW-7

20.2 NTU IPC-1 20 NTU

0.034 NTU QC Blank IDC Runs DC.I-014

Report: PE005
Performance Evaluation Report — Page: 1
USEPA Water Supply Study WS040 — Date: 18MAR98

Participant ID: WY00003 Type: STATE Requesting Office: RC3

Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
TRACE METALS IN MICROGRAMS PER LITER:				
001-ARSENIC				
001	112	102	89.3- 113	Accept.
002-BARIUM				
001	3020	2700	2300- 3110	Accept.
003-CADMIUM				
001	5.99	6.31	5.05- 7.57	Accept.
004-CHROMIUM				
001	95.7	90.9	77.3- 105	Accept.
005-LEAD				
001	68.6	71.0	49.7- 92.3	Accept.
006-MERCURY				
001	1.40	1.50	1.05- 1.95	Accept.
007-SELENIUM				
001	79.5	74.0	59.2- 88.8	Accept.
091-COPPER				
001	1680	1700	1530- 1870	Accept.
140-ANTIMONY				
001	14.0	13.0	9.1- 16.9	Accept.
141-BERYLLIUM				
001	6.58	6.60	5.61- 7.59	Accept.
142-NICKEL				
001	25.9	25.0	21.3- 28.8	Accept.
226-BORON				
002	1230	1150	1050- 1290	Accept.
236-MANGANESE				
002	30.0	32.0	27.7- 35.2	Accept.
237-MOLYBDENUM				
002	38.2	35.0	29.6- 40.1	Accept.
239-ZINC				
002	1750	1700	1620- 1850	Accept.
NITRATE/NITRITE/FLUORIDE IN MILLIGRAMS PER LITER:				
009-NITRATE AS N				
001	7.19	7.10	6.39- 7.81	Accept.
010-FLUORIDE				
001	1.31	1.29	1.16- 1.42	Accept.
092-NITRITE AS N				
001	1.7	1.30	1.11- 1.5	Not Accept.
261-ORTHOPHOSPHATE AS P				
001	2.65	0.820	0.745-0.882	Not Accept.
MISCELLANEOUS ANALYTES:				
022-RESIDUAL FREE CHLORINE (MILLIGRAMS PER LITER)				
001	0.35	0.240	0.0199-0.364	Accept.
023-TURBIDITY (NTU'S)				
001	7.81	7.80	7- 9.67	Accept.

WS040 Source of MOL study QC 5

INITIAL DEMONSTRATION OF CAPABILITY
For Precision and Accuracy
Data Summary

Study Number: MM-1

Method: 180.1 | Analyte: TURBIDITY

SOP Number/Revision: REVISION 2 | Date Completed: 12-6-06

Instrument Name and Model Number: HACH 2100N TURBIDIMETER

Instrument Software (version): KYOSHA C029.KS

Reason for Study: NEW EMPLOYEE

Source of Calibration Standard (Name / Lot #): W075 APHA/LOT #611731

Quality Control Sample (Name / Lot #): EPA WS-34

True Value: 0.720NTU

Data QC Sample was Made: 12-6-06

Date of Analysis: 12-6-06

Replicate	Concentration (NTU)	Percent Recovery
#1	0.862	120
#2	0.857	110
#3	0.859	119
#4	0.837	116

Mean Recovery: 116 | Accuracy Limit: 62 -155% | Source of Limit: WS034

% RSD: 4.03 | Precision Limit: <5% RSD | Source of Limit: SOP

Marta M. McElrath 12.6.06
Analyst / Date.

12-7-06

Revision Date 09/21/06

TURBIDITY

EPA METHOD 180.1

INITIAL DEMONSTRATION OF CAPABILITY

Lot/Tracking Numbers		Calibration Standards	NTU		Percent Recovery
		0.0 NTU	0.052		
		20 NTU	20.0		
W075		200 NTU	200.0		
		1000 NTU	1000.0		
		4000 NTU	4000.0		
Lot/Tracking Numbers		Samples	Conductivity in uS/cm	Reported Value	Percent Recovery
W075		CVS-0.50 NTU	0.552		110
W075		CVS-10 NTU	10.1		101
W075		CVS-20 NTU	20.3		102
W075		CVS-30 NTU	29.7		99
W075		CVS-40 NTU	39.2		98
		QC Blank	0.034	0.034	
W075		LFB	19.9		100
		LRB	0.034	0.068	
WS034		IDC-1	0.862	0.862*	120
WS034		IDC-2	0.857	0.857*	110
WS034		IDC-3	0.859	0.859*	119
WS034		IDC-4	0.837	0.837*	116
ERA CAT.#699QR		UNKNKOWN	6.86	6.860	106
ERA CAT.#699QR		UNKNKOWN	6.9	6.900	107
ERA CAT.#699QR		UNKNKOWN SPIKE	17.1	17.100	102
ERA CAT.#699QR		UNKNKOWN SPIKE DUPLICATE	17.2	17.200	103
		Check Standard	20.5	20.50	103
		QC Blank	0.036	0.04	
		Std. Deviation:	4.6809		
		Mean:	116.22		
		RSD:	4.03		
*IDC Acceptance Range: 0.446-1.12 NTU from WS034 Study					

C:\Documents and Settings\ms249b\Desktop\2006 MDL STUDIES\Martha\TURBIDITY MDL2006

1 of 2

HACH 2100N P 1.2
HACH 2100N P 1.2

Turbidity Method 180.1
12-6-06 1:30 PM MDM

CALIBRATION DATA
UNITS: NTU
STANDARDS:
00 0.0523
01 20.000
02 200.00
03 1000.0
04 4000.0
COEFFICIENTS:
A0=566.47200
B0=0.0020624
B1=0.0006938
C0=0.0020310
C1=0.0008246
C2=-0.000190

IDC + Unknown Analysis

~~0.560 NTU~~ Not stable

0.552 NTU 1 TV- 0.50

10.1 NTU - TV-10

20.3 NTU – TV-20

29.7 NTU - TV-30
~~38.9 NTU~~
39.2 NTU - TV-40

19.9 NTU LFB

0.034 NTU LRB

0.862 NTU IDC-1 TV- ~~0.781~~ 0.720 MDM

~~0.904 NTU~~ Not Stable

0.857 NTU IDC-2 TV- ~~0.781~~ 0.720 MDM

~~0.207 NTU~~ Not stable

0.859 NTU IDC-3 TV - ~~0.781~~ 0.720

0.837 NTU IDC-4 TV - ~~0.781~~ 0.720

6.86 NTU Unknown T.V: 6.46

6.90 NTU Unknown Dup

17.1 NTU Unknown Spike
Spiked at 10 NTU

17.2 NTU Unknown Spike Dup
Spiked at 10 NTU

20.5 NTU Chk. Std

0.036 NTU QC Blank

Performance Evaluation Report
USEPA Water Supply Study WS034

Page: 8
Date: 03NOV94

Participant ID: Type: Requesting Office:

Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
INORGANIC DISINFECTION BY-PRODUCTS IN MICROGRAMS PER LITER:				
193-BROMATE				
01	.	7.52	D.L. - 33.8	
194-CHLORATE				
01	.	70.0	54.2- 86.6	
195-CHLORITE				
01	.	260	180- 405	
MISCELLANEOUS ANALYTES:				
022-RESIDUAL FREE CHLORINE(MILLIGRAMS PER LITER)				
01	.	1.60	1.23- 1.73	
023-TURBIDITY(NTU'S)				
01	.	0.720	0.446- 1.12	
024-TOTAL FILTERABLE RESIDUE(MILLIGRAMS PER LITER)				
01	.	319	216- 536	
025-CALCIUM(MG. CACO3/L)				
01	.	180	169- 193	
026-PH-UNITS				
01	.	9.12	8.86- 9.27	
027-ALKALINITY(MG. CACO3/L)				
01	.	33.0	30.7- 37.2	
028-CORROSIVITY(LANGELIER IND. AT 20C)				
01	.	0.943	0.611- 1.23	
029-SODIUM(MILLIGRAMS PER LITER)				
01	.	15.2	13.7- 16.6	
144-CORROSIVITY(AGGRESSIVE IND. AT 20C)				
01	.	12.9	12.5- 13.2	
145-SULFATE(MILLIGRAMS PER LITER)				
01	.	400	364- 435	
146-TOTAL CYANIDE(MILLIGRAMS PER LITER)				
01	.	0.140	0.105-0.175	
251-ETHYLENE THIOUREA (ETU)				
01	.	32.4	10.4- 56.4	
252-DIOXIN(IN PG/L)				
01	.	26.0	18.3- 32.4	

WS034 Source of IDC 4 replicates for Precision + Accuracy RW

********** END OF DATA FOR **********
NOTE: FOR LIMITS AND TRUE VALUES, ASSUME THREE SIGNIFICANT DIGITS.
********** END OF REPORT FOR **********

* Based on theoretical calculations, or a reference value when necessary.

ENVIRONMENTAL SOURCE ASSOCIATES®
The Industry Standard™

QuiK™ Response Final Report
Project Number: 091206F

West Virginia Department of Health
Environmental Chemistry Lab
4710 Chimney Drive, Suite G.
Charleston, West Virginia 25302

ERA Laboratory Code: W2134-01
EPA Lab ID: WV00003

Results reported by: Larry Duffield
Title: Program Manager I
Phone # 304-965-2694
Fax # 304-965-2696

Study Open Date: 9/12/2006
Study Close Date: 9/25/2006
Report Issue Date: 9/26/2006

WatR™ Supply Turbidity (cat# 699QR)

Analyte No.	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description
0023	Turbidity	NTU	7.04	6.46	5.70 - 7.61	Acceptable	EPA 180.1

(#699QR
Source of
IDC Unknown)

RECEIVED
SEP 26 2006

Tom Ong
<tomong@wvdhhr.org>
09/27/2006 03:58 PM

To George Long/ESC/R3/USEPA/US@EPA
cc
bcc
Subject Re: WVAWC- Kanawha Valley lab inspection 9/21/06

Yes, that method had been dropped. It was inadvertently left on the database.

Thomas L. Ong, Microbiologist Supervisor
Chief - Laboratory Certification Officer
Chief - Laboratory Evaluation Officer
WVDHHR - BPH
Office of Laboratory Services
167 - 11th Avenue
South Charleston, WV 25303
Phone: 304-558-3530, Ext. 2710
email: tomong@wvdhhr.org

>>> <Long.George@epamail.epa.gov> 09/27 2:59 PM >>>
Tom:

Upon looking at the certificate for the WVAWC- Kanawha Valley lab, I see
that they are certified for , in addition to
Colilert, also Heterotropic Bacteria by pour- plate Method. We don't remember discussing the HTPC method with you. Is this something that has
been dropped from their certification?

Sincerely,

George Long

Joe Slayton/ESC/R3/USEPA/US
09/27/2006 03:40 PM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc George Long/ESC/R3/USEPA/US@EPA, WandaF Johnson/R3/USEPA/US@EPA
bcc
Subject Re: Brief update from our Trip to WV and help requested with some questions

WandaJ we have been doing some checking of WV issued Lab Certification certificates and need to add Asbestos and Sodium to the listing in Question #1 below.
Joe Slayton/ESC/R3/USEPA/US

Joe Slayton/ESC/R3/USEPA/US
09/26/2006 12:30 PM

To WandaF Johnson/R3/USEPA/US
cc George Long/ESC/R3/USEPA/US@EPA
Subject Brief update from our Trip to WV and help requested with some questions

Wanda Johnson: A good trip to WV and good news regarding the State's Lab Cert Program. They are staying on track with the inspection schedule, time lines for inspection report writing and Certificate Issuances. Their PT tracking is up to date and the web page that tracks the Cert Status is on schedule. We have completed a draft report for the Lab cert program but I had promised to first check with you on the following items:

1). The listing of analytes reviewed by the WV SDWA Lab Cert program in the assessment of laboratories does not include the following analytes: turbidity, pH, silica, PO4, conductivity, TOC, SUVA, calcium/hardness and alkalinity. Ok?

2). The WV Lab Cert Program is performed by the Office of Laboratory Services, in the Bureau of Public Health of the WV Department of Health and Human Resources. They perform SDWA laboratory assessments and certifications for the Office of Environmental Health Services (OEHS). The OLS managers asked if any of the EPA Grant money for WV's SDWA program is for laboratory certifications? The OLS managers are not aware of any financial support from EPA.

3). Could you check with your OEHS program manager contacts regarding their policy for resampling when the analysis of nitrate and nitrite analyzed as the sum (NO2+NO3)-N exceeds 1 mg/L (MCL for nitrite)?

4). A statement included in our inspection report from 3 years ago still applies today:

"The laboratory lost the capability to perform the analyses of organic contaminants for SDWA in 1997. These analyses are performed by commercial laboratories certified by West Virginia. Efforts are underway to regain this analytical capability. Any assistance by the EPA Region 3 Water Protection Division would be greatly appreciated, as expertise in organic analyses would not only provide a valuable capability for the WV SDWA program, but also would greatly improve WV's ability to oversee and certify laboratories for organic analyses". Obviously it is up to the WV Drinking Water program how it operates, but

perhaps you could ask them if they are aware that the lack of on-going analytical experience with the analysis of organics adversely impacts the certifications of commercial labs doing the analyses for the program?

5). Did you hear back from WV program folks regarding the number of SDWA compliance sample analysis done by commercial laboratories versus the number by the State Laboratory?

Perhaps our next assessment trip (three years from now) can be coordinated with one of your WV program reviews. I think that would be great. Thanks, JoeS

Joe Slayton/ESC/R3/USEPA/US
09/27/2006 03:47 PM

To Jason Gambatese/R3/USEPA/US@EPA
cc George Long/ESC/R3/USEPA/US@EPA
bcc
Subject Fw: Brief update from our Trip to WV and help requested with some questions

JasonG I had mentioned EPA R3 is pretty tough on our State labs requiring official certification or approval (requirements are the same) for just about everything. We certify State labs based on what they request to be certified for on a presurvey package (essentially a menu). We formally issue a certificate at the end of each year which goes to the EPA R3 Drinking Water program (Rick Rogers) for distribution to EPA's State Program Managers. The idea is if the program managers are concern about an area not being covered they will check with their State counterpart and make sure other labs certified by the state for those areas is covering that monitoring requirement.

A related topic is the anaytes that the State SDWA certification program reviews and approves/certifies at commercial labs. Could you provide input on Question #1 below based on regulations (as opposed to our simple hard line approach for R3 State Labs)?

---- Forwarded by Joe Slayton/ESC/R3/USEPA/US on 09/27/2006 03:40 PM ----

Joe Slayton/ESC/R3/USEPA/US
09/27/2006 03:40 PM

To Joe Slayton/ESC/R3/USEPA/US
cc George Long/ESC/R3/USEPA/US@EPA, WandaF Johnson/R3/USEPA/US@EPA
Subject Re: Brief update from our Trip to WV and help requested with some questions

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Joe Slayton/ESC/R3/USEPA/US
09/26/2006 12:30 PM

To WandaF Johnson/R3/USEPA/US
cc George Long/ESC/R3/USEPA/US@EPA
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Perhaps our next assessment trip (three years from now) can be coordinated with one of your WV program reviews. I think that would be great. Thanks, JoeS

Larry Duffield
<larryduffield@wvdhhr.org>
09/01/2006 09:38 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc George Long/ESC/R3/USEPA/US@EPA
bcc
Subject Re: Fw: PreSurvey

Joe,

We'll have to get back with you Tuesday on this matter, I have to leave for the day. Have a good holiday.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

>>> <Slayton.Joe@epamail.epa.gov> 8/31/2006 9:46:45 AM >>>

----- Forwarded by Joe Slayton/ESC/R3/USEPA/US on 08/31/2006 09:46 AM -----

Joe
Slayton/ESC/R3/USEPA/US
08/30/2006 07:22 PM

To Larry Duffield <larryduffield@wvdhhr.or>
cc George Long/ESC/R3/USEPA/US@EPA
Subject Fw: PreSurvey

LarryD: George Long and I have been working our way thru the material you sent and we have noticed several missing items:--please fill in status of each below. Thanks.

1). No CN IDC and MDL studies (MDL provided is 12/05 by an analyst no longer at the lab);

2). F- only MDL is 2/05 by an analyst no longer at the lab);

3). No MDL study for Nitrate via 353.2;

4). No MDL & IDC for Nitrate via 300.0 (only studies are by an analyst no longer at the lab);

5). No MDL & IDC for Nitrite via 300.0 (only studies are by an analyst no longer at the lab);

6). No MDL study for Chloride via 300.0;

7). No MDL study for sulfate via 300.0;

8). No MDL study for Ca/Ca Hardness;

9). No IDC and MDL studies for turbidity.

----- Forwarded by Joe Slayton/ESC/R3/USEPA/US on 08/30/2006 07:10 PM -----

Joe Slayton/ESC/R3/USEPA/US 08/11/2006 07:57 AM	Larry Duffield <larryduffield@wvdhhr.org>	To cc

Subject

Re: PreSurvey(Document link: Joe Slayton)

I have always enjoyed working with your folks in WV. Tom is a very nice
guy. Sorry to hear of his loss. Joe

Larry Duffield <larryduffield@wvdhhr.org>

08/11/2006 07:48 AM

To

Joe Slayton/ESC/R3/USEPA/US@EPA

cc

Subject

Re: PreSurvey

Joe,

I shall inquire on my own next week, although you copied this to all the right people. I believe Charlotte Billingsley has informed you of

Ex. 6 - Personal Privacy

Ex. 6 - Personal Privacy I am sure he has the form saved in a file, but he's probably the only one with access to it.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

>>> <Slayton.Joe@epamail.epa.gov> 8/10/2006 5:45:55 PM >>>
Almost forgot...any chance of getting a copy of the micro-presurvey (which includes the microchecklist) as an electronic file?

Larry Duffield <larryduffield@wvdhhr.org>
To Joe Slayton/ESC/R3/USEPA/US@EPA
08/10/2006 10:15 AM
cc George Long/ESC/R3/USEPA/US@EPA, Andrea Labik <andrealabik@wvdhhr.org>, Charlotte Billingsley

<charlottebillingsley@wvdhhr.org>

, Tom Ong <tomong@wvdhhr.org>

Subject

PreSurvey

Joe,

Yesterday, we mailed to you a box containing the documents, data, info,
etc. that you requested for the PreSurvey evaluation. Included is a disc that contains our QA Manual, Certification SOP, and Chemistry method SOPs. The QA Manual is for both the Chemistry and Micro sections. Two of the metals SOPs that you will see are incomplete or obsolete and should be disregarded. The SOPs in use have signed signature pages, copies of which I have sent you. I also included a copy of the Chemistry Presurvey form and Tom Ong's Micro PreSurvey form.
I thought you might like an electronic copy of the Chem PreSurvey so I
attached it.
We mailed the materials Certified/Priority, so you should get it by Monday.
If there is anything missing, deficient, or puzzling, please let me know immediately and we'll deal with it.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

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destroy all copies of the original message."

(See attached file: Attach 3 Presurvey 6-20-06.rtf)

Joe
Slayton/ESC/R3/USEPA/US
08/10/2006 05:35 PM

To Larry Duffield <larryduffield@wvdhhr.org>
cc
bcc
Subject Re: PreSurvey

Wow! Thanks much
Larry Duffield <larryduffield@wvdhhr.org>

Larry Duffield
<larryduffield@wvdhhr.org>
08/10/2006 10:15 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc George Long/ESC/R3/USEPA/US@EPA, Andrea Labik <andrealabik@wvdhhr.org>, Charlotte Billingsley <charlottebillingsley@wvdhhr.org>, Tom Ong <tomong@wvdhhr.org>
Subject PreSurvey

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WVDHHR-Office of Laboratory Services
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Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

Attach 3 Presurvey 6-20-06.rtf

Joe Slayton/ESC/R3/USEPA/US
08/14/2006 11:44 AM

To George Long/ESC/R3/USEPA/US@EPA
cc
bcc
Subject Fw: PreSurvey

----- Forwarded by Joe Slayton/ESC/R3/USEPA/US on 08/14/2006 11:43 AM -----

Charlotte Billingsley <charlottebillingsley@wvdhhr.org>
08/14/2006 09:26 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc Mike Flesher <mikeflesher@wvdhhr.org>, Tom Ong <tomong@wvdhhr.org>, Tracy Goodson <tracygoodson@wvdhhr.org>
Subject Re: PreSurvey

Joe, I will send you an electronic copy of the Micro Presurvey Packet as soon as I can. Tom Ong has asked to be on leave until Aug. 21.We have learned a lesson concerning access to computers! I will forward an electronic copy as soon as possible.

>>> <Slayton.Joe@epamail.epa.gov> 8/10/2006 5:45:55 PM >>>
Almost forgot...any chance of getting a copy of the micro-presurvey (which includes the microchecklist) as an electronic file?

Larry Duffield
<larryduffield@wvdhhr.org>
08/10/2006 10:15 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc George Long/ESC/R3/USEPA/US@EPA, Andrea Labik <andrealabik@wvdhhr.org>, Charlotte Billingsley

<charlottebillingsley@wvdhhr.org>

, Tom Ong <tomong@wvdhhr.org>

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Phone: (304) 965-2694 X 2222
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E-Mail: larryduffield@wvdhhr.org

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destroy all copies of the original message."

(See attached file: Attach 3 Presurvey 6-20-06.rtf)

Joe
Slayton/ESC/R3/USEPA/US
07/20/2006 11:47 AM

To Tom Ong <tomong@wvdhhr.org>
cc George Long/ESC/R3/USEPA/US,
bcc
Subject Re: WV On-site

Great TomO! Either will work and Colilert is GeorgeL's favorite. JoeS
Tom Ong <tomong@wvdhhr.org>

Tom Ong
<tomong@wvdhhr.org>
07/20/2006 09:08 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc
Subject Re: WV On-site

Actually, we have WVAW here in Charleston that we could do. I will have to check to see if they are available that date. There is also WVAW in Huntington that is only an hour away. Both labs are just doing Colilert.

Let me know if you want to do a Micro Lab and I will set something up.

Thomas L. Ong, Microbiologist Supervisor
Chief - Laboratory Certification Officer
Chief - Laboratory Evaluation Officer
WVDHHR - BPH
Office of Laboratory Services
167 - 11th Avenue
South Charleston, WV 25303
Phone: 304-558-3530, Ext. 2710
email: tomong@wvdhhr.org

>>> <Slayton.Joe@epamail.epa.gov> 07/19 4:03 PM >>>
TomO: Thanks for the information/corporate history. It was many moons
ago if C. Jones was present. Given that, I would say an oversight inspection for Micro is just as appropriate as chemistry. Do you have
a micro lab which is due for an on-site and say within an hour's drive

or less of Charleston, WV?

Tom Ong
<tomong@wvdhhr.org>
07/19/2006 11:14 AM

To: Joe Slayton/ESC/R3/USEPA/US@EPA
cc: Charlotte Billingsley <charlottebillingsley@wvdhhr.org>, Larry Duffield <larryduffield@wvdhhr.org>, Mike Flesher <mikeflesher@wvdhhr.org>, Tracy Goodson <tracygoodson@wvdhhr.org>
Subject: WV On-site

Joe,

Larry and I are still up in the air with regards to the joint on-site inspection with EPA. I believe originally, a joint on-site with the chemistry CO's was planned but there were time and distance issues. George Long sent me an email wanting to know when the last joint on-site with the Micro CO's was and that doing a joint Micro on-site might alleviate some of Larry D.'s issues. I told him that we did not go out in the field on the last on-site, but it may have been the time before that and that I couldn't really remember. I do remember that Charlie

Jones was there. I never heard back from George.

So...Larry and I still don't know what we should schedule for the certification program review? Please let us know.

Thanks,

Thomas L. Ong, Microbiologist Supervisor
Chief - Laboratory Certification Officer
Chief - Laboratory Evaluation Officer
WVDHHR - BPH
Office of Laboratory Services
167 - 11th Avenue
South Charleston, WV 25303
Phone: 304-558-3530, Ext. 2710
email: tomong@wvdhhr.org

Please save with WV file

Joe
Slayton/ESC/R3/USEPA/US
07/19/2006 04:03 PM

To Tom Ong <tomong@wvdhhr.org>
cc Charlotte Billingsley <charlottebillingsley@wvdhhr.org>, Larry Duffield <larryduffield@wvdhhr.org>, Mike Flesher <mikeflesher@wvdhhr.org>, Tracy Goodson
bcc
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Tom Ong <tomong@wvdhhr.org>

Tom Ong
<tomong@wvdhhr.org>
07/19/2006 11:14 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc Charlotte Billingsley <charlottebillingsley@wvdhhr.org>, Larry Duffield <larryduffield@wvdhhr.org>, Mike Flesher <mikeflesher@wvdhhr.org>, Tracy Goodson <tracygoodson@wvdhhr.org>
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Chief - Laboratory Certification Officer
Chief - Laboratory Evaluation Officer
WVDHHR - BPH
Office of Laboratory Services
167 - 11th Avenue
South Charleston, WV 25303
Phone: 304-558-3530, Ext. 2710
email: tomong@wvdhhr.org

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Joe Slayton/ESC/R3/USEPA/US
07/18/2006 11:19 AM

To George Long/ESC/R3/USEPA/US@EPA
cc
bcc
Subject Fw: Corrective Action Report for WS-118

---- Forwarded by Joe Slayton/ESC/R3/USEPA/US on 07/18/2006 11:18 AM ----

Larry Duffield <larryduffield@wvdhhr.org>
07/18/2006 10:39 AM

To Charlie Jones/R3/USEPA/US@EPA
cc Joe Slayton/ESC/R3/USEPA/US@EPA, Andrea Labik <andrealabik@wvdhhr.org>, Charlotte Billingsley <charlottebillingsley@wvdhhr.org>
Subject Corrective Action Report for WS-118

Mr. Jones,

Attached is a Corrective Action Report for the failed Turbidity PT in ERA WS-118. We have really been scratching our heads on this one. We have never had so much trouble with this test. We will keep trying.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

CAR WS-118 Turbidity to Charles J ones.doc

Tom Ong
<tomong@wvdhhr.org>
06/29/2006 10:42 AM

To George Long/ESC/R3/USEPA/US@EPA

cc Charlotte Billingsley <charlottebillingsley@wvdhhr.org>, Larry Duffield <larryduffield@wvdhhr.org>, Mike Flesher <mikeflesher@wvdhhr.org>, Tracy Goodson

bcc

Subject Re: Fw: WV Health Laboratory SDWA On-site and WV SDWA LabCertificationProgram Review

George,

Actually, the last on-site audit was in 2003 and we did not visit a micro lab at that time. However, Joe and I did visit the micro lab at WV American Water's Kanawha Valley Treatment Plant during a past on-site audit but it wasn't in 2003. I actually cant remember the exact year either, but if it helps, I seem to remember Charlie Jones being there as well.

Thomas L. Ong, Microbiologist Supervisor
Chief - Laboratory Certification Officer
Chief - Laboratory Evaluation Officer
WVDHHR - BPH
Office of Laboratory Services
167 - 11th Avenue
South Charleston, WV 25303
Phone: 304-558-3530, Ext. 2710
email: tomong@wvdhhr.org

>>> <Long.George@epamail.epa.gov> 06/28 3:59 PM >>>

Dear Tom:

Joe has forgotten if he accompanied you on a micro lab on-site audit the last time (1999). If not , we could schedule one while we're there in Sept and it would solve Larry's problems (below) in scheduling a chemistry lab audit..

Answers to Larry's questions below the underlined text are typed in.

Thank You,

George Long
----- Forwarded by George Long/ESC/R3/USEPA/US on 06/28/2006 03:39 PM

Joe
Slayton/ESC/R3/
USEPA/US

To: George Long/ESC/R3/USEPA/US@EPA

06/28/2006
02:47 PM

cc:

Subject: Fw: WV Health Laboratory SDWA On-site and WV SDWA Lab CertificationProgram Review

---

----- Forwarded by Joe Slayton/ESC/R3/USEPA/US on 06/28/2006 02:47 PM -----

Larry Duffield
<larryduffield@
wvdhhr.org>

To: Joe Slayton/ESC/R3/USEPA/US@EPA

06/27/2006
11:20 AM

cc: Gregory Young
<gregoryyoung@wvdhhr.org>

Subject: Re: WV Health Laboratory SDWA

On-site and WV SDWA Lab

CertificationProgram Review

Joe,

I have been reviewing your letter and Pre-survey requirements. Here's a couple questions:

You state in the cover letter that you want us to schedule an on-site at one of the private labs that we certify in order for you to observe our procedure. We do not have any labs in the Charleston area anymore.
SGS lab just down the road from us has halted all analytical work and is
sending samples elsewhere. REI Consultants is due this year for their triennial inspection, but they are at the other side of Beckley, about an hour and fifteen minute drive down the turnpike if you can go the speedlimit. This is a big lab certified for most all inorganic and organic parameters, and normally takes us 2-3 days to complete an inspection. I suppose we could do a partial inspection and finish the next week. It will still make for a very long day. Let me know if that
will be okay so that we can start making preparations now.

You are requesting supporting data for IDCs, MDLs, and PTs prior to your visit, which we will do. But the question is will you want us to make photo copies of chart recordings that are generated by the Technicon for nitrates and by the flat-bed recorder for the old Mercury
analyzer?

YES

Will you want all "supporting" data and summaries scanned in and sent electronically with the presurvey? That's a lot of scanning.

NO, SIMPLY MAIL THAT MATERIAL

Speaking of the old Mercury Analyzer, as I informed you earlier, it's broke, can't be fixed. We haven't been able to turn in a PT for Hg this
year. We've been trying to adapt our Varian AA for Hg, but so far it has been much too noisey too develop. I haven't pulled the plug yet on

this prospect, we'll see. Meanwhile, we are working to purchase a new Hg analyzer, but I don't think it would be ready for the on-site. So, I'm in a bit of a quandary as to whether to request an inspection and/or
certification for Hg.

SINCE YOU MIGHT GET IT WORKING, GO AHEAD AND MAKE THE REQUEST FOR THE INSPECTION/CERTIFICATION.

Let me know. Thanks.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

>>> <Slayton.Joe@epamail.epa.gov> 6/26/2006 12:02:57 PM >>>
Signed hardcopies are being mailed today.

(See attached file: Coverletter PS-6-26-06.doc)

(See attached file: Attach 3 Presurvey 6-20-06.rtf)(See attached file: Micro Presurvey_6-20-06.rtf)

If you have any questions or problems completing the forms or collected
the material requested prior to the on-site, please let me or George Long know. Thanks, Joe Slayton

WV file

George
Long/ESC/R3/USEPA/US
06/28/2006 03:59 PM

To TomOng@wvdhhr.org
cc LarryDuffield@wvdhhr.org, Joe Slayton/ESC/R3/USEPA/US@EPA
bcc
Subject Fw: WV Health Laboratory SDWA On-site and WV SDWA Lab CertificationProgram Review

Dear Tom:

Joe has forgotten if he accompanied you on a micro lab on-site audit the last time (1999). If not , we could schedule one while we're there in Sept and it would solve Larry's problems (below) in scheduling a chemistry lab audit..

Answers to Larry's questions below the underlined text are typed in.

Thank You,

George Long

---- Forwarded by George Long/ESC/R3/USEPA/US on 06/28/2006 03:39 PM ----

Joe
Slayton/ESC/R3/USEPA/US
06/28/2006 02:47 PM

To George Long/ESC/R3/USEPA/US@EPA
cc
Subject Fw: WV Health Laboratory SDWA On-site and WV SDWA Lab CertificationProgram Review

---- Forwarded by Joe Slayton/ESC/R3/USEPA/US on 06/28/2006 02:47 PM ----

Larry Duffield
<larryduffield@wvdhhr.org>
06/27/2006 11:20 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc Gregory Young <gregoryyoung@wvdhhr.org>
Subject Re: WV Health Laboratory SDWA On-site and WV SDWA Lab CertificationProgram Review

Joe,

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inspection. I suppose we could do a partial inspection and finish the next week. It will still make for a very long day. Let me know if that will be okay so that we can start making preparations now.

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YES

Will you want all "supporting" data and summaries scanned in and sent electronically with the presurvey? That's a lot of scanning.

NO, SIMPLY MAIL THAT MATERIAL

Speaking of the old Mercury Analyzer, as I informed you earlier, it's broke, can't be fixed. We haven't been able to turn in a PT for Hg this year. We've been trying to adapt our Varian AA for Hg, but so far it has been much too noisey too develop. I haven't pulled the plug yet on this prospect, we'll see. Meanwhile, we are working to purchase a new Hg analyzer, but I don't think it would be ready for the on-site. So, I'm in a bit of a quandary as to whether to request an inspection and/or certification for Hg.

SINCE YOU MIGHT GET IT WORKING, GO AHEAD AND MAKE THE REQUEST FOR THE INSPECTION/CERTIFICATION.

Let me know. Thanks.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

>>> <Slayton.Joe@epamail.epa.gov> 6/26/2006 12:02:57 PM >>>
Signed hardcopies are being mailed today.

(See attached file: Coverletter PS-6-26-06.doc)

(See attached file: Attach 3 Presurvey 6-20-06.rtf)(See attached file: Micro Presurvey_6-20-06.rtf)

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06/28/2006 02:47 PM

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---- Forwarded by Joe Slayton/ESC/R3/USEPA/US on 06/28/2006 02:47 PM ----

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06/27/2006 11:20 AM

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Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
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yes

ND

Just mail no scanning

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Request it and include PT and not DOC

Let me know. Thanks.

Sure you still might get it to work go ahead and

Larry A. Duffield
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Long/ESC/R3/USEPA/US@EPA, Pat
Hurr/CI/USEPA/US@EPA, Dave
Russell/ESC/R3/USEPA/US@EPA, Annie
Hilliard/ESC/R3/USEPA/US, Jason
Gambatese/R3/USEPA/US@EPA
Subject Proficiency Testing Analyses for SDWA Microbiology

RickR: I got a call today from Grier Mills with VA DCLS in Richmond. The bottom line of our discussion is that it would be helpful for VA DCLS as they are updating their SDWA regulations for certification of laboratories, if EPA R3 could provide a brief letter encouraging R3 States to require or at least encourage labs to participate in such PT studies. This is really needed as the CFR does not mandate this and the current Manual for Certification of Laboratories Analyzing Drinking Water 5th edition (January 2005) only recommends participation in PTs for microbiology (Chapter 5 Critical Elements for Microbiology): "5.6.2.4.5 Performance studies. The laboratory should periodically analyze an external QC sample, such as a performance testing sample, when available. The laboratory also should participate in available interlaboratory performance studies conducted by local, state and federal agencies or commercial organizations".

In addition, I wanted to point out that R3's certification of our State Laboratories has required PT participation to obtain full certified for microbiology (where available). As this is a policy decision, it I think should come from the WPD.

Larry Duffield
<larryduffield@wvdhhr.org>
06/27/2006 12:08 PM

To Charlie Jones/R3/USEPA/US@EPA
cc Joe Slayton/ESC/R3/USEPA/US@EPA
bcc
Subject New Employee

Charlie,

Just wanted to inform you that we have found a replacement for Joe Cochran, who left us on May 16, 2006. Martha McElfresh started on June 16, 2006 and will be performing, after proper training, the tasks that Joe was responsible for in our Wet Chem lab. This would include Nitrates by cadmium reduction, Cyanide by ion selective electrode, parameters by Ion Chromatography, TDS, conductivity, and other tests. Martha has a B.S. in Chemistry and brings with her many years of experience working for the state and private labs. At her previous employer, SGS, she accumulated extensive experience with organics analysis and data review which we hope to someday soon exploit for our program.

gen'l int
file

Larry A. Duffield
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Environmental Chemistry Section
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Charleston, WV 25302
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FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

Elvira Greenawalt
<greyelvira@ccon.net>

06/27/2006 12:21 PM

Please respond to
Elvira Greenawalt
<greyelvira@ccon.net>

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc
bcc
Subject Re: with oueee

Hi

Go to our site and econom ize on your med up to 60 %
http://hedacilepadeca.com

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,
,
,
,
holes to make a house in but not to spend summer days in, felt he was being slowly suffocated. The nights were the worst. It then became pitch-dark €"not what you call pitch-dark, but really pitch; so black that you really could see nothing. Bilbo tried flapping his hand in front of his nose, but he could not see it at all. Well, perhaps it is not true to say that they could see nothing: they could see eyes. They

WV file

Joe Slayton/ESC/R3/USEPA/US
07/20/2006 02:31 PM

To Larry Duffield <larryduffield@wvdhhr.org>
cc George Long/ESC/R3/USEPA/US@EPA, Rick Rogers/R3/USEPA/US, WandaF Johnson/R3/USEPA/US
bcc
Subject Re: WV Health Laboratory SDWA On-site and WV SDWA LabCertificationProgram Review

Thanks. I think the labs certified by WV to perform SDWA analyses for PWS will be covered in our review of WV's SDWA Lab Cert Program.

What about labs the WV State SDWA program uses instead of WV's Health Lab to analyses samples they take, e.g., does the program office ever take samples for Organic SDWA targets and if so where do they send them since the WV Health Lab does not have that capability and are those lab/s SDWA certified? If you are not sure of the answer to this questions could you please forward to the WV SDWA program office.
Larry Duffield <larryduffield@wvdhhr.org>

Larry Duffield <larryduffield@wvdhhr.org>
07/20/2006 12:38 PM

To George Long/ESC/R3/USEPA/US@EPA
cc Joe Slayton/ESC/R3/USEPA/US@EPA
Subject Re: WV Health Laboratory SDWA On-site and WV SDWA LabCertificationProgram Review

I have a question about one of your requests on the PreSurvey form. Under Section V. you request us to: "Provide a listing of all laboratories the state laboratory utilizes for compliance analyses and copies of current SDWA certificates for these laboratories that includes the corresponding methods and analytes."
Our laboratory does not use or subcontract out to other labs. Our Certification Program, however, certifies many labs in and out of state for compliance monitoring of state PWS. This would be data that we never see, it goes directly to the Data Management section of the Office of Environmental Health Services.
So, do you want information on the labs we certify (several), or info on labs we use directly (none)?

Larry A. Duffield
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Chief Certification Officer, Chemistry
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FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

the contents of this message is strictly prohibited. If you have received this message in error, please notify the sender immediately and destroy all copies of the original message."

Larry Duffield
<larryduffield@wvdhhr.org>
07/27/2006 07:52 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc George Long/ESC/R3/USEPA/US@EPA
bcc

Subject Fwd: Re: WV Health Laboratory SDWA On-site and WV SDWALabCertificationProgram Review

Joe,
I passed your question over to the program office, this is as much of an answer as we have gotten so far. Walt Ivey is the manager over the Environmental Engineering Division and Charlie Robinette passed the issue up to him. As far as I can tell, Walt has not opened the e-mails yet and may be out of town. I asked to be copied to any of their responses. I will keep you informed.

Larry A. Duffield
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FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

Send to Nick Rogers & the EPA WV SDWA program manager

>>> Charles Robinette 7/24/2006 10:04:42 AM >>>
Walt:
We have discussed this issue previously. As I recall the discussion, the only time we ever take organic samples has been in conjunction with a spill of some sort, and we typically rely on WVDEP or USEPA, as it is prior to treatment, not after treatment (compliance sampling location per SDWA requirements).

Since you are out today, and I will be out the remainder of the week, I suspect you will need to respond. Was not sure if I should respond or not.

>>> Larry Duffield 7/21/2006 8:01:44 AM >>>
Charlie,

I think you or Walt should answer this question. I think the answer is no, but I'm not sure. We haven't discussed this issue for several months. I think basically Joe wants to know if the Engineers ever take samples for compliance monitoring and to what lab you take them. This issue gets back to the requirements for retainment of primacy, that is, the "Principle State Laboratory" must be able to provide all necessary testing, organic and inorganic, that is listed in the certification manual. And if you will recall, that's why your office was working on a "Memorandum of Understanding" with Virginia's lab. After I told you last year that we were going to try to share equipment with the Chemical Terrorism (CT) section down the hall here to get certified for organics, I think the VA MOU was put on hold. Well, since we talked, the "partnership" with CT has been put on indefinite hold, because we were not going to be allowed any control of the equipment, and other issues.
We are being audited on-site in September and they are wanting lots of Presurvey information.
Anyway, I would appreciate it if you would give Mr. Slayton an answer on this, and copy to me. Thanks.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
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FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

>>> <Slayton.Joe@epamail.epa.gov> 7/20/2006 2:42:39 PM >>>
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Larry Duffield

<larryduffield@

wvdhhr.org>

To

George Long/ESC/R3/USEPA/US@EPA

07/20/2006

cc

12:38 PM

Joe Slayton/ESC/R3/USEPA/US@EPA

Subject

Re: WV Health Laboratory SDWA

On-site and WV SDWA

LabCertificationProgram Review

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WV 2006 file

Joe Slayton/ESC/R3/USEPA/US
06/21/2006 05:30 PM

To Robin Costas/ESC/R3/USEPA/US@EPA, Dave Russell/ESC/R3/USEPA/US@EPA, George Long/ESC/R3/USEPA/US@EPA
cc
bcc
Subject WV On-site Cover Letter and Presurvey Package

Folks please look this over as we would like to send it out Monday or Tuesday next week (6/26 or 27). GeorgeL has worked hard on updating the Presuvey package to correct errors (several directly in the Lab Cert Manual) and adding more important/ relevant questions concerning their quality system. The big change is to continue the approach used for PA-DEP on-site in which we gave them more lead time for the Presurvey package but requested lots of data be sent to us ahead of time. We admit some of the formatting could use some additional work (continues to be problematic because of the conversion from WP to Word--the many tables and checklists from the Lab Cert Manual were provided by Cinc as .wpd). So if you are skilled with MS word and can fix stuff please do so, e.g., "page" appears in the header on most pages on the screen but does not print. Hey if it is a quick fix go for it...otherwise let it go as WV will need more time with this to get the needed material and send it ahead. JoeS


Coverletter PS-6-21-06.doc


Attach 3 Presurvey 6-20-06.rtf


Micro Presurvey_6-20-06.rtf

Larry Duffield
<larryduffield@wvdhhr.org>
05/16/2006 08:51 AM

To George Long/ESC/R3/USEPA/US@EPA
cc Joe_Slayton/ESC/R3/USEPA/US_Wanda_Johnson@epamail.epa.gov, Charlie Jones/R3/USEPA/US@EPA
bcc
Subject Re: WV on-site audit

George,

Sorry I didn't get to talk to Joe about the on-site last week when he called. August or September looks okay so far. I do, however, have meetings for the afternoons of Aug. 10 and 24 that would be difficult to get out of.
As far as the organics is concerned, we haven't been able to make any progress in that area. We originally thought last year and up until January that we would be able to "timeshare" equipment with the Threat Preparedness lab to develop capabilities for the organic methods and more. We have since found this plan is unworkable due to their security restrictions and other management problems. So it looks like you will not have to bring any organics people.
We do have equipment now in our possession to develop methods for TOC and SUVA, but I did not believe that EPA was certifying or approving for these parameters yet. I really doubt that we would be ready for an on-site for these two by August anyway.
One more thing I need to tell you: We are losing one of our chemists, Joe Cochran, as of today. He has been working in the Wet Chemistry section of our lab, analyzing the inorganic nonmetals. Greg Young will be doing that work until we can replace Joe, and we do have a very good prospect. We will let you know when we do.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
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FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

>>> <Long.George@epamail.epa.gov> 5/15/2006 4:21:58 PM >>>
Dear Larry:

We are making plans for the 2006 inspection. Do you yet have full capability in organics? If so then we will bring some organic

auditors.
The inspection would also consist of two added days for a cert program audit. How does something
in the months of Aug or Sept sound?

Thanks

George Long

Larry Duffield
<larryduffield@wvdhhr.org>
04/17/2006 08:27 AM

To Charlie Jones/R3/USEPA/US@EPA
cc Robert Lange/R3/USEPA/US@EPA, Joe Slayton/ESC/R3/USEPA/US@EPA, Andrea Labik <andrealabik@wvdhhr.org>, Charlotte Billingsley
bcc
Subject CAR for WS-115 & Hg Analyzer

Mr. Jones,

Attached you will find our Corrective Action Report for the failed parameters of WS-115. Also attached is a letter explaining our Mercury situation. Signed copies have been mailed.

If you need more information, please let me know.

Larry A. Duffield
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Mercury Analyzer Notice.doc


Corective Action Report WS-115 to Charles Jones.doc

Joe
Slayton/ESC/R3/USEPA/US
04/17/2006 05:04 PM

To George Long/ESC/R3/USEPA/US@EPA
cc Robin Costas/ESC/R3/USEPA/US@EPA
bcc
Subject Fw: CAR for WS-115 & Hg Analyzer

---- Forwarded by Joe Slayton/ESC/R3/USEPA/US on 04/17/2006 05:04 PM -----

Larry Duffield
<larryduffield@wvdhhr.org>
04/17/2006 08:27 AM

To Charlie Jones/R3/USEPA/US@EPA
cc Robert Lange/R3/USEPA/US@EPA, Joe Slayton/ESC/R3/USEPA/US@EPA, Andrea Labik <andrealabik@wvdhhr.org>, Charlotte Billingsley <charlottebillingsley@wvdhhr.org>, Gregory Young <gregoryyoung@wvdhhr.org>
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Mercury Analyzer Notice.doc


Corective Action Report WS-115 to Charles Jones.doc

STATE OF WEST VIRGINIA
DEPARTMENT OF HEALTH AND HUMAN RESOURCES

Joe Manchin III
Governor

Martha Yeager Walker
Secretary

August 30, 2006

To: OEHS District Engineering Offices and County Health Departments

From: Office of Laboratory Services
Environmental Chemistry Laboratory
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: 1-304-965-2694
FAX: 1-304-965-2696

This memorandum is being sent to inform your offices and pertinent personnel about an important change in policy regarding acceptance of samples by our laboratory for Alkalinity, Conductivity, Total Dissolved Solids (TDS), and Sulfates. In the past we have accepted samples for these parameters without ice to decrease shipping expenses and accommodate our clients' data quality objectives that do not relate to SDWA Compliance Monitoring. However, to provide legally defensible data for all purposes, our new policy requires samples for these four parameters to be received on ice at 4° C, to comply with certified methods for analyses.

Therefore, as of **September 30, 2006**, **ALL** samples for those parameters that are required to be shipped on ice must be received on ice at the correct temperature, and of course within the proper holding times and with included pertinent information, **or the sample(s) will be rejected and a resample will be requested.** We have made this decision in order to continue to improve and make Environmental Chemistry the best reference laboratory possible. As always, if you have questions about this policy, sampling and shipping instructions, or any other matters feel free to contact us.

Please distribute copies of this letter to the affected personnel within your office.

We thank you in advance for your understanding, cooperation, and compliance with this issue.

Best Regards,

Larry A. Duffield
Program Manager I
Environmental Chemistry Laboratory

Joe Slayton's questions from 8-31-2006:

1. No CN IDC and MDL Studies
(MDL provided is 12/05 by an analyst no longer at the lab);
We sent Joe Cochran's Method Detection Limits because he has done the work in the wet chemistry laboratory for the past three years and only left in May of 2006. The only other set of MDLs are Greg Young's which where reviewed during the 2003 audit. We will be submitting Greg's MDL from 2003. Martha McElfresh is still in training for this method.
2. F-only MDL is 2/05 by an analyst no longer at the lab:
See comment for item one.

3. No MDL study for nitrate via 353.2
After reviewing the MDL studies for EPA method 353.2, the MDL Summary Sheet for Nitrate/Nitrite needs to be relabeled to "Nitrate with Acidification". The Fortified Reagent Water for the Nitrate/Nitrite study contained only Nitrate and no Nitrite due to the conversion of Nitrite to Nitrate in the presence of Sulfuric Acid. We do need to do an MDL study for "Nitrate without Acidification" and will present this to you at the time of the audit with a revised (relabeled) MDL Summary Sheet for "Nitrate with Acidification".

4.&5. No MDL & IDC for nitrate and nitrite via 300.0
(only studies are by an analyst no longer at the lab);
Either Greg Young or Martha McElfresh will be doing the MDL and IDC for Nitrate and Nitrite and should have the both completed at the time of the Audit.

6.&7. No MDL study for chloride and sulfate via 300.0
The MDL study for Chloride and Sulfate should be with the Fluoride MDL packet analyzed in February 2005. Fluoride, Chloride and Sulfate are all analyzed by the same method. Again, we presented Joe Cochran's studies because he has done the work in the wet chemistry laboratory for the past three years and we will be submitting Greg's 2003 MDL for the above analytes.

8. No MDL study for Ca/Ca Hardness.
Joe, we may need some guidance in determining an MDL for this titration method. The burette used is graduated in 0.1 ml increments, which equals approximately 2 drops of titrant. Based upon the formula to calculate Calcium and Ca Hardness the limit for reporting Ca Hardness as CaCO3 is 2 mg/L and the limit for Ca is 0.8 mg/L. Because of the limitations of the burette, is it possible to determine an MDL? Help?

9. No IDC and MDL studies for turbidity.
Joe, we will be presenting the data to you at the time of the audit. Because of our problems with the last two Proficiency testing studies, several changes are being made to our procedure. We will be presenting to you a new Standard Operating Procedure (the SOP was based upon EPA method 180.1 which omitted the MDL study and needs to be added), IDC, IDL, MDLs and, we hope, a successful Proficiency Testing Sample.

Joe Slayton/ESC/R3/USEPA/US
09/26/2006 12:45 PM

To Charlottebillingsley@WVdhhr.org
cc George Long/ESC/R3/USEPA/US@EPA
bcc
Subject Fw: Brief update from our Trip to WV and help requested with some questions

CharlotteB: FYI ass per our discussions last week:
----- Forwarded by Joe Slayton/ESC/R3/USEPA/US on 09/26/2006 12:44 PM -----

Joe Slayton/ESC/R3/USEPA/US
09/26/2006 12:30 PM

To WandaF Johnson/R3/USEPA/US
cc George Long/ESC/R3/USEPA/US@EPA
Subject Brief update from our Trip to WV and help requested with some questions

Wanda Johnson: A good trip to WV and good news regarding the State's Lab Cert Program. They are staying on track with the inspection schedule, time lines for inspection report writing and Certificate Issuances. Their PT tracking is up to date and the web page that tracks the Cert Status is on schedule. We have completed a draft report for the Lab cert program but I had promised to first check with you on the following items:

1). The listing of analytes reviewed by the WV SDWA Lab Cert program in the assessment of laboratories does not include the following analytes: turbidity, pH, silica, PO4, conductivity, TOC, SUVA, calcium/hardness and alkalinity. Ok?

2). The WV Lab Cert Program is performed by the Office of Laboratory Services, in the Bureau of Public Health of the WV Department of Health and Human Resources. They perform SDWA laboratory assessments and certifications for the Office of Environmental Health Services (OEHS). The OLS managers asked if any of the EPA Grant money for WV's SDWA program is for laboratory certifications? The OLS managers are not aware of any financial support from EPA.

3). Could you check with your OEHS program manager contacts regarding their policy for resampling when the analysis of nitrate and nitrite analyzed as the sum (NO2+NO3)-N exceeds 1 mg/L (MCL for nitrite)?

4). A statement included in our inspection report from 3 years ago still applies today:

"The laboratory lost the capability to perform the analyses of organic contaminants for SDWA in 1997. These analyses are performed by commercial laboratories certified by West Virginia. Efforts are underway to regain this analytical capability. Any assistance by the EPA Region 3 Water Protection Division would be greatly appreciated, as expertise in organic analyses would not only provide a valuable capability for the WV SDWA program, but also would greatly improve WV's ability to oversee and certify laboratories for organic analyses". Obviously it is up to the WV Drinking Water program how it operates, but perhaps you could ask them if they are aware that the lack of on-going analytical experience with the analysis of organics adversely impacts the certifications of commercial labs doing

the analyses for the program?

5). Did you hear back from WV program folks regarding the number of SDWA compliance sample analysis done by commercial laboratories versus the number by the State Laboratory?

Perhaps our next assessment trip (three years from now) can be coordinated with one of your WV program reviews. I think that would be great. Thanks, JoeS

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Joe Slayton/ESC/R3/USEPA/US
09/26/2006 12:55 PM

To Charlottebillingsley@WVdhhr.org
cc George Long/ESC/R3/USEPA/US@EPA
bcc
Subject Fw: Brief update from our Trip to WV and help requested with some questions

CharlotteB could you please convey to your Program Managers:

#1Good seeing everyone. Glad to find things in such good shape. Thanks for all the hard work. Please keep on "keep'n on".

I had several action items:

1). Send EPA's GLAP guidance document for LIMS:


2185galp.pdf

2). Our QS including SOP on technical systems audits. I burned 4 CDs and they are in the mail to you.

3). Status of 317.0:

http://www.epa.gov/fedrgstr/EPA-WATER/2006/January/Day-04/w03.pdf

4. Topics for COs meeting (records retention and technical topics perhaps should be in two time slots chemistry/micro)--added to our list.

5. Number of questions for Wanda Johnson the EPA SDWA Program Manager for WV--I forwarded my list of questions to you.

A few things we need:

a. Could you please provide Dan Hill's Email address so I can request example materials used to review and approve rad chem labs?

b. We need a copy of Tracy Goodson's CO certificate/course completion notice.

c. Once the on-site microbiology inspection report for the assessment we observed is completed, please forward a copy of the report and also the corrective action response once received from the facility.

Thanks, JoeS

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09/26/2006 12:30 PM

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Larry Duffield
<larryduffield@wvdhhr.org>

08/10/2006 10:15 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA

cc George Long/ESC/R3/USEPA/US@EPA, Andrea Labik <andrealabik@wvdhhr.org>, Charlotte Billingsley <charlottebillingsley@wvdhhr.org>, Tom Ong

bcc

Subject PreSurvey

History: This message has been replied to.

Joe,

Yesterday, we mailed to you a box containing the documents, data, info, etc. that you requested for the PreSurvey evaluation. Included is a disc that contains our QA Manual, Certification SOP, and Chemistry method SOPs. The QA Manual is for both the Chemistry and Micro sections. Two of the metals SOPs that you will see are incomplete or obsolete and should be disregarded. The SOPs in use have signed signature pages, copies of which I have sent you. I also included a copy of the Chemistry Presurvey form and Tom Ong's Micro PreSurvey form. I thought you might like an electronic copy of the Chem PreSurvey so I attached it.
We mailed the materials Certified/Priority, so you should get it by Monday.
If there is anything missing, deficient, or puzzling, please let me know immediately and we'll deal with it.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

Attach 3 Presurvey 6-20-06.rtf

Larry Duffield
<larryduffield@wvdhhr.org>
08/11/2006 07:48 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc
bcc
Subject Re: PreSurvey

History: This message has been replied to.

Joe,

I shall inquire on my own next week, although you copied this to all the right people. I believe Charlotte Billingsley has informed you of the unfortunate tragedy that befell Tom Ong Last weekend with the sudden and tragic passing of his wife. I doubt he will be back to work for a week or two. I am sure he has the form saved in a file, but he's probably the only one with access to it.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

>>> <Slayton.Joe@epamail.epa.gov> 8/10/2006 5:45:55 PM >>>
Almost forgot...any chance of getting a copy of the micro-presurvey (which includes the microchecklist) as an electronic file?

Larry Duffield
<larryduffield@w
vdhhr.org>
08/10/2006 10:15
AM

To
Joe Slayton/ESC/R3/USEPA/US@EPA
cc
George Long/ESC/R3/USEPA/US@EPA,
Andrea Labik

<andrealabik@wvdhhr.org>,

Charlotte Billingsley

<charlottebillingsley@wvdhhr.org>

, Tom Ong <tomong@wvdhhr.org>

Subject

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"Confidentiality Notice: This message, including any attachments, is for the sole use of the individual or entity named above. The message may contain confidential health and/or legally privileged information. If you are not the above-named recipient, you are hereby notified that any disclosure, copying, distribution, or action taken in reliance on the contents of this message is strictly prohibited. If you have received this message in error, please notify the sender immediately and
destroy all copies of the original message."

(See attached file: Attach 3 Presurvey 6-20-06.rtf)

Larry Duffield
<larryduffield@wvdhhr.org>
08/07/2006 07:52 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc George Long/ESC/R3/USEPA/US@EPA
bcc
Subject PreSurvey

History: This message has been replied to.

Joe,

We've got a lot of material that will have to be U.S. Mailed to you that you requested in the PreSurvey form. Could you give me your exact address so the package will arrive at your doorstep on time. We will mail this Wed. or Thursday so you will have it by next Monday as you requested.
On your letterhead is listed:

United States Environmental Protection Agency
Environmental Science Center
Analytical Services and Quality Assurance Branch
701 Mapes Road
Fort Meade, MD 20755-5350

Is this what we should use and just put it to your attention?

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SCIENCE CENTER
Analytical Services and Quality Assurance Branch
701 Mapes Road
Fort Meade, MD 20755-5350

October 24, 2006

Dr. Andrea Labik, Director
Office of Laboratory Services
WV Department for Health
167 11th Avenue
South Charleston, WV 25303

Dear Dr. Labik:

The assessment team has completed the reports resulting from the on-site SDWA review of your laboratory and the WV Laboratory Certification Program conducted on September 19-22, 2006. We request that you provide a written corrective action plan to address the listed findings within 30 days of receipt of this report (November 24, 2006).

If you have any questions please call me at 410-305-2653 or E-mail Slayton.joe@epa.gov

Sincerely,

Joseph Slayton
Technical Director

cc: Wanda Johnson (3WP22)
Charles Jones, Jr. (3EA00)
Robin Costas (3EA20)
George Long (3EA20)
Dave Russell (3EA20)

Final On-Site Laboratory Evaluation Report (SDWA)

Inorganic Chemistry

(Rev. 10-24-06 JS)

West Virginia Department of Health and Human Resources
Bureau for Public Health
Office of Laboratory Services
Environmental Chemistry Laboratory Section
4710 Chimney Drive, Suite G
Charleston, WV 25302

On-site: September 19-20, 2006

Surveyed by:

Robin Costas
George Long
Joseph Slayton

U.S.E.P.A. - Region III
Analytical Services and Quality Assurance Branch
701 Mapes Road
Ft. Meade, Maryland 20755-5350

A. Introduction:

On September 19-20, 2006 an on-site inspection of inorganic chemistry was conducted of the West Virginia Department of Health and Human Resources, Bureau for Public Health, Office of Laboratory Services167 11th Avenue, South Charleston, West Virginia 25303-1137. The chemical analyses of drinking water samples are conducted at a separate location, Environmental Chemistry Laboratory Section, 4710 Chimney Drive, Suite G, Charleston, WV 25302. The purpose of this inspection was to determine the capability of the laboratory to perform its mission as it relates to the Safe Drinking Water Act (SDWA). The laboratory was represented by Charlotte Billingsley, Associate Director Office of Laboratory Services, Larry Duffield, Program Manager (Environmental Chemistry), Greg Young, Chemist II (fluoride, chloride, sulfate, nitrate/nitrite, cyanide, TDS, pH, turbidity, conductivity, thallium), Patrick Marchio, Chemist I (metals), Martha McElfresh, Chemist I (same non-metal analytes as listed for Greg Young), Patrick Marchio, Chemist I (metals), Becky Payne, Laboratory Assistant III (alkalinity, calcium/calcium hardness) and Rebecca Hill, Office Assistant II (sample receiving, log-in, sample status tracking and reporting).

This inspection was conducted by: Robin Costas, Chemist (evaluation of metals), George Long (evaluation of inorganic non-metals) and Joseph Slayton, Technical Director (evaluation of inorganic, non-metals and quality system). The assessors represent the USEPA, Region III, Analytical Services and Quality Assurance Branch, located at 701 Mapes Road, Ft. Meade, Maryland 20755-5350.

The laboratory lost the capability to perform the analyses of organic contaminants for SDWA in 1997. These analyses are performed by commercial laboratories certified by West Virginia. Efforts are underway to regain this analytical capability. Any assistance by the EPA Region 3 Water Protection Division would be greatly appreciated, as expertise in organic analyses would not only provide a valuable capability for the WV SDWA program, but also would greatly improve WV's ability to oversee and certify laboratories for organic analyses. The listing in Section F of this report, "Contaminant Method Information" is the regulated and unregulated parameters for which the laboratory requested SDWA certification and approval, as part of the pre-survey questionnaire for this on-site assessment.

The laboratory provided copies of SDWA certificates for the commercial laboratories in West Virginia that could be utilized by the program.

A number of the inorganic analytes require "cool, 4°C" preservation (alkalinity, conductivity, cyanide, nitrite, nitrate, TDS, Turbidity, Sulfate). Alkalinity, conductivity, TDS and sulfate are not cooled during transport to the laboratory. The samples collected by Environmental Health Services are described as not being for compliance purposes but for engineering purposes, e.g., a double check on the distribution system. As a corrective action for the last on-site assessment, the laboratory routinely label the results for such unpreserved samples as "Sample >4 Celsius, Not Valid for SDWA Compliance Reporting".

SDWA samples for total nitrate are routinely analyzed and reported as a sum for (NO2+NO3)-N.

Consistent with regulations, the State uses a concentration of 10 mg/L to "trigger" the re-sampling and re-analysis.

B. Personnel:

Since the last on-site assessment, the Program Manager was replaced (currently Larry Duffield) and two new analysts have been hired (Patrick Marchio replacing Larry Duffied and Martha McElfresh. These hires replaced vacancies resulting from one retirement and one analyst leaving the laboratory.

The courtesy and professionalism of the laboratory personnel was greatly appreciated by the inspection team. It was apparent from the extensive quality control procedures, that the laboratory personnel are dedicated to achieving analytical excellence.

C. Proficiency Testing (PT) Samples:

The laboratory results for Proficiency Testing samples for the years 2004 through 2006 were reviewed during the on-site evaluation (WS91, WS103 and WS115 from Environmental Resource Associates). The laboratory results were "Acceptable" for all regulated inorganic parameters reported with the exception of the following "Not Acceptable" results:
WS91 (April 2004) - chloride, conductivity and fluoride; beryllium, selenium, and silver
WS103 (April 2005) - turbidity; aluminum
WS115 (April 2006) - turbidity; copper, aluminum,
July 2006 (makeup) - turbidity.

All of these parameters were successfully reanalyzed with a makeup PT with the exception of turbidity.

The only on-going problematic analyte has been turbidity. To resolve the problem/s, the laboratory is using a new meter for turbidity analyses, has purchased other reference materials and has been working with the instrument manufacturer to resolve issues regarding the mandatory use of a very wide concentration range for calibration. Another PT sample had been purchased at the time of this inspection and has since been analyzed and reported. The scored result was acceptable and helps confirm that the laboratory has corrected the analytical problem/s.

Aluminum has been difficult to analyze by GFAAS so the laboratory is in the process of validating a method using the ICP instrumentation.

D. Assessment Procedures/ Data Audit:

The assessment included interviews of analysts and management, inspection of equipment and calibration materials and the review of records. The records included the laboratory QA Manual and technical SOPs, demonstration of capability and method detection limit performance studies, Proficiency Testing (PT) results, recent internal audit report, EPA's last on-site inspection report and laboratory analytical reports (May 2006 and May 2005). The analytical records review

traced the results from the original instrument and other measurements to the final results and for samples and PTs this included log-in records.

E. Analytical Method References:

The list of parameters in Section E were audited during this inspection with the associated methodology cited as follows:

(SM) - Standard Methods for the Examination of Water and Wastewater, 18th edition.
(EPA83) - Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79/83.
(EPA93) - Determination of Inorganic Substances in Environmental Samples, Aug 1993, EPA/600/R-93/100.
(EPA94) - Methods for the Determination of Metals in Environmental Samples, May 1994, EPA/600/R-94/111.
(CLADW) - Manual for the Certification of Laboratories Analyzing Drinking Water, Criteria and Procedures Quality Assurance, January 2005, EPA 815-R-05-004.

F. Contaminant Method Information: *Primary Inorganic Chemicals, Parameters in the Lead and Copper Rule, Sodium and Turbidity:*

Parameter	Method	Instrumentation
Antimony	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Arsenic	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Barium	ICP (EPA94, 200.7)	Varian Liberty 100
Beryllium	GFAAS (SM 3113B)	Varian SpectraAA - 400 Plus
Cadmium	GFAAS (SM 3113B)	Varian SpectraAA - 400 Plus
Chromium	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Copper	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Copper	Flame (SM 3111B)	Varian SpectrAA - 400 Plus
Lead	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Mercury	CVAAS (EPA94, 245.1)	Cetac QuickTrace M-6100
Selenium	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Sodium	Flame AA (SM 3111B)	Varian SpectrAA - 400 Plus
Thallium	GFAAS (EPA94, 200.9)	Perkin-Elmer 5100, HGA 600

Primary Inorganic Chemicals, Parameters in the Lead and Copper Rule, Sodium and Turbidity (Continued):

Parameter	Method	Instrumentation
Alkalinity	Titration (SM 2320B)	25 mL Buret
Calcium/	Titration (SM 2320B)	25 mL Buret
Calcium	(3500 CA D)	25 mL Buret
Hardness	(SM 2320B)	

Conductance	Conductance (SM 2510B)	Orion 162A
Cyanide	Ion Selective Electrode (SM 4500CN-F)	Orion Model EA 940 Meter Orion ISE and Double Junction Reference
Fluoride	Ion Chromatography (EPA93, 300.0)	Dionex-120
Nitrate	Automated Cadmium (EPA93, 353.2)	Technicon Auto-Reduction Analyzer II
Nitrite	Automated Cadmium (EPA93, 353.2)	Technicon Auto-Reduction Analyzer II
pH	Electrometric (EPA83, 150.1)	Corning 430 Meter & 3-In-One Electrode
Turbidity	Nephelometric (EPA93, 180.1)	HACH 2100A Turbidimeter

Optional Primary Contaminants:

Parameter	Method	Instrumentation
Nickel	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Total Hardness	Titration (SM 2340C)	25 mL Buret

Secondary Contaminants:

Parameter	Method	Instrumentation
Aluminum	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Iron	Flame AA (SM 3111B)	Varian SpectrAA - 400 Plus
Manganese	Flame AA (SM 3111B)	Varian SpectrAA - 400 Plus
Silver	GFAAS (SM 3113B)	Varian SpectrAA - 400 Plus
Zinc	Flame AA (SM 3111B)	Varian SpectrAA - 400 Plus
Chloride	Ion Chromatography (EPA93, 300.0)	Dionex-120/Conductivity Detector
Sulfate	Ion Chromatography (EPA93, 300.0)	Dionex-120/Conductivity Detector
TDS	Gravimetric (SM 2540C)	Gelman A/E GF Filters; Blue M Oven; Mettler AG-245

G. Calibration & Detection Information:

Maximum Contaminant Level (MCL), Method Detection Limit (MDL), Reporting Limit (RL as defined by the WV Laboratory.)

Primary Contaminants; Lead and Copper Rule; Sodium and Turbidity:

Contaminant	***Calibration Standards*** **(mg/L)**	**MCL (mg/L)**	**MDL (ug/L)**	**RL (ug/L)**
Metals:				
Antimony	BLK; 0.003; 0.006; 0.012	0.006	1.22	3
Arsenic	BLK; 0.002; 0.005; 0.010; 0.020	0.010	0.62	2
Barium	BLK; 0.005; 5.0; 10.0	2.00	0.0005	5

Beryllium	BLK; 0.0002; 0.0005; 0.001; 0.002	0.004	0.03	0.2
Cadmium	BLK; 0.001; 0.002; 0.004	0.005	0.10	1
Chromium	BLK; 0.001; 0.0025; 0.005; 0.010	0.100	0.48	1
Copper(GFAAS)	BLK; 0.001; 0.0025; 0.005; 0.010	1.3*	0.19	1
Copper (flame)	BLK; 0.025; 0.050; 0.1; 0.5;1.0	1.3*	0.004	1
Lead	BLK; 0.001; 0.0025; 0.005; 0.010	0.015*	0.18	1
Mercury	New instrument not yet on line	0.002		
Selenium	BLK; 0.002; 0.005; 0.010	0.050	0.4	2
Sodium	BLK; 2.0; 5.0; 10.0; 15.0; 20.0	20.0+	0.07	2000
Thallium	BLK; 0.002; 0.004; 0.008	0.002		
Non-Metals:				
Conductance	BLK; 106.1; 210; 314; 416 uS/cm	-	-	-
Cyanide	BLK; 0.05; 1.25; 0.2; 0.3; 0.4	0.2	2	50
Fluoride	BLK; 0.1; 0.2; 0.50; 1.00; 2.00	4.0	2.3	100
Nitrate	BLK; 0.05; 0.10; 0.25; 0.50; 1.00	10.0	5	50
Nitrite	BLK; 0.05; 0.10; 0.25; 0.50; 1.00	1.0	6	50
	Cd Column Check Standard (1.0)			
pH	4.0; 7.0; 10.0 (pH Units)	[6.5-8.5]	-	-
TDS	NIST Traceable Std. Wts.	[500]	-	-
Turbidity	BLK; See recommendation section	-	-	-

* "Action Level"
+ "Reportable Level"
[ ] = Suggested MCL (SMCL)

H. Quality Control (QC) Procedures:

The laboratory follows a "Manual of Quality Assurance for Environmental Chemistry Laboratory and Environmental Microbiology Laboratory", (QA Manual, Rev. 2006). This document includes: QA plan and policy statement; laboratory organization; employee job descriptions; list of standard operational procedures; WV certified analyses for drinking water (groups); order from for sample bottles; order form for sample bottles; sampling instructions; sample handling procedures; reporting of results; chain of custody (formal internal tracking is limited to cases which may involve litigation); quality assurance monitoring; analytical procedures; data reduction; data verification; data validation; data reduction, validation, reporting and storage; preventive maintenance; internal quality control and corrective action; precision and accuracy samples; proficiency testing; quantitative verification check with each batch of samples; and acronyms and definition of terms.

A partial list of the QC procedures observed during this inspection included: on-going temperature records of refrigerators and drying ovens; analysis of an external (2^{nd} source) QC sample with each analytical batch; routine digestion and analysis of a blank spiked at the reporting level, method detection limit determinations; duplicate analysis (precision measure); spike analysis (accuracy/recovery measure); blank analysis/batch; check standards (instrument performance checks) at beginning, end and 10% frequency (instrument drift measure); cadmium column reduction efficiency measured and recorded; standard weights employed to verify balance performance; on-going compilation and charting of QC check results; and the resistance/conductivity of lab pure water recorded each day of use.

I. Analytical Deviations:

Deviations (findings) are those laboratory techniques not in compliance with the mandatory requirements of the analytical methods cited above or with the CLADW. In addition, procedures/techniques, which are considered critical by the inspectors for the production of quality data are cited as "Good Laboratory Practices" (GLP). The following changes are required for the laboratory to be in compliance with the SDWA program (40 CFR 142.10).

Metals:

1. The digestion matrix used for 200.7 samples (1% nitric/0.5% HCl) does not match the method. The digestion procedure will need to be adjusted to meet the method requirement of 2% nitric/1%HCl. (200.7, 11.2.3)

2. Once the new mercury instrument is on-line and validated, a determination of certification will be made based on submittal of the SOP, IDC, MDL, and PT information.

3. Thallium by 200.9 cannot be certified at this time. The current instrumentation (PE 5100) is not capable of producing acceptable data. This situation will have to be resolved before certification can be considered.

Inorganic Non-metals:

1. The laboratory reporting sheets (results provided to customers), include a listing of laboratory MDLs. This needs to be updated to reflect current performance studies. (GLP, CLADW Section IV, 8.1)

2. The TDS bench sheets need to be updated to include the volume of sample. (GLP, CLADW Section IV, 8.1)

3. To complete the records for pH results, the lot numbers for the pH buffers need to be recorded and the certificates for pH reference buffers need to be on file (traceability). (GLP, CLADW Section IV, 8.1)

4. The analytical records for alkalinity (H2SO4) and hardness (EDTA) need to include the certificates for the titrant since this material is purchased as "certified". (GLP, CLADW Section IV, 8.1)

5. To complete the analytical records for TDS, the serial number for the reference weights used to verify analytical balance accuracy must be recorded. (GLP, CLADW Section IV, 8.1)

6. The thermometer calibration records were found to be incomplete. All thermometer calibrations with document that lacks serial numbers of the reference thermometers need to be repeated. (GLP, CLADW Section IV, 7.1.5 and 8.1)

7. Once the new turbidity instrument is on-line and validated, a determination of certification will be made based on submittal of the SOP, IDC, MDL, and PT information.

8. Ion Chromatography supporting data needs to include a hardcopy of the chromatographs. (Laboratory's 2006 QA Manual, appendix K, p.88-89 and CLADW Section IV, 8.1)

J. Recommendations:

The following suggestions are offered to help improve the quality and integrity of the data the laboratory generates.

Suggestions for Metals

a. The SOP sections that describe the procedure to make the LFB should include the final volume of the solution.

b. All of the SOPs, need to explain that an LFB at the reporting level is also digested.

c. The SOP for 3113B needs to include the description in 7.2.1 (12) b. of the matrix used for chromium.

d. The 3113B SOP should have an explanation of how the manual analytical spike is prepared by the instrument and link it better to the term QC Spike A. (Sections 7.2.1(6), 7.1.11.k.(11), and Appendix A.)

e. Need to be consistent on whether or not an adjustment is made to makeup for the volume of acid used for preservation. Currently, this is being done either in the digestion step, with the standards matrix or not at all. If an adjustment is made, it should be done consistently and a note included in the SOP to explain the difference from the method.

f. For consistency and easier tracking of changes, it is suggested that the SOP for copper by flame not be a stand-alone method and that it be included in the original 3111B SOP.

g. Several terms are used in the SOPs and during analysis that do not match. There needs to be a consistency in terms or an easy cross-reference. For example: Lab Re-Blank, QCS (Ricca, JT Baker), MCL, QCSTD10, IPC.

h. The Standards/Reagent log is very complete, but it is not easy to interpret or to track to the analysis which ones were used. For example, it needs to be clear as to exactly which intermediate solutions are used as stocks for working standards.

i. It cannot be determined from the flame data what the true values are for the spiked matrix samples and the fortified blanks. If this information is not written directly on the data, it is suggested that section 5.3.3 in the 3111B SOP be edited to include an easy link to the true values, either pointing to section 4.10.4 or editing the table to include the TVs.

j. Even though the correlation coefficient calculated by Varian instrument is unknown, the analyst has always checked the linearity by a calculator program. These two do not match exactly, but, it is agreed that the difference is insignificant, especially when the value is over 0.999. It is suggested that a note be made in the SOP that this is the case. In the future, it may be possible to make use of the new LIMS system for downloading and calculation of this data.

Suggestions for Inorganic Non-metals:

a. All stock calibration solutions should be labeled with a unique identifier which would appear in the preparation log and in the run files/records.

b. Consideration should be given to having balance check record and temperature records directly as part of TDS records.

c. Should have written procedures for internal audits.

d. 10% of all data should be checked by a peer not just results that exceed MCLs.

e. QM should include sample number systems for both chemistry and microbiology and indicate exactly how SDWA compliance samples are uniquely labeled.

f. The laboratory should continue with plans to refrigerate samples for alkalinity, conductivity, TDS and sulfate which will eliminate the current practice of flagging all data as not to be used for compliance purposes, e.g., ice chests and blue ice type materials purchased and a letter to program engineers prepared.

g. The acceptance limits for pH check standards and duplicates should be changed from RPDs and % recovery to pH units (example 0.05), since pH is a log scale analyte.

h. Mechanical pipets are calibrated each year. It is suggested that this be increased to once/quarter.

i.. The standard preparation log for conductivity should include the vendor of the reagent salt.

j. The Technicon Auto Analyzer is very old and should be replaced with an instrument utilizing new technology with an operating system that is more compatible with the new LIMS (e.g., flow injection analyses).

k. All IC data files should include a run tabulation as used for Technicon analysis of nitrate/nitrite.

l. The turbidity instrument requires a wide NTU range for proper calibration, however, the suggested range is significantly beyond the 40 NTU upper limit set by the reference method. If the manufacturer cannot provide a software adjustment, it is suggested that after the broad range calibration for the instrument, the narrow range required by the method be verified by reading back the calibration standards as if samples and recording this "calibration". Acceptance limits should be set for the "read-back" turbidity values as part of this calibration. The SOP should be updated to reflect the final procedure.

J. Even though the correlation coefficient calculated by Dionex instrument is unknown, the analyst has always checked the linearity by a calculator program. These two do not match exactly, but, it is agreed that the difference is insignificant. It is suggested that a note be made in the SOP that this is the case. In the future, it may be possible to make use of the new LIMS system for downloading and calculation of this data.

Suggestions for inorganic Non-metals IDCs/MDLs:

a. Ion Chromatography (IC) performance studies need tablulation of concentration data (F, SO4, Cl).

b. IC data needs to include the actual chromatograms.

c. Files should include SOP document control number/ rev. #.

d. All MDLs should include the Student-t value.

e. All IDC/MDLs should include the reason for the performance study.

f. All IDCs need to list the source of the precision and accuracy limits.

g. All IDCs need certificates or some documentation for 2nd source and primary standards/ or titrant, etc.

h. The laboratory should consider running MDLs spiked at the reporting level since it results in concentrations that are more easily measurable and have more meaning since they are better defined by the calibration. Also, unless required by the method, analyzing MDLs over several days is a suggestion (not required).

i. MDL studies should be performed for calcium/hardness, alkalinity and conductivity.

j. All IDC and MDL studies should list the instrument software version where applicable.

Global Laboratory Suggestions:

a. The laboratory should develop a records management system, i.e., each SOP, notebook, PT, IDC, MDL, QM, sample data file, etc., is assigned a unique number and an effective date.

b. The laboratory should have an ethics policy and provide ethics training yearly for all personnel.

c. Although, the QA Manual is extensive and well written, the next time that the manual is updated the following items described in the CLADW should be considered: a process to determine data quality objectives (driven by use of data by clients); listing of SOPs effective dates and status, e.g., in revision); traceability of calibration material (primary and second source); certificate retention for reference weights, reference thermometers and reference materials; create a "QS Components Table" which lists all parameters analyzed indicating dates for last MDL, IDC, SOP, PT, and internal review; laboratory policy for calculating MDL and IDC data; laboratory policy for dropping outlier data from MDLs, IDCs, and calibrations (should rely directly on observations of laboratory accidents and statistical tests for outliers); frequency of recertification of reference weights and thermometers; action limits for the calibration of mechanical pipets; include qualifying data or not report data when QC difficulties cannot be resolved (e.g., do not report the data or qualify the result as an estimate with an indication of the direction of bias); pollution prevention (steps taken to reduce the harmful impact of analyses); in addition the data verification section of the manual should require that data be reviewed

routinely by a second person (not just when MCLs are exceeded) (e.g., review and spot checking of 10% of the data with sign off by a second analyst); a set schedule should be established for internal assessments; consideration should be given to transferring of the QAO duties to the QA committee to avoid having managers as QAOs; the minutes of the QA committee should be compiled and given a quality system document control number; the quality system should state a frequency for SOP reviews (yearly) with revisions as needed with significant change (changes in instrument, personnel or method which could impact accuracy, precision or sensitivity); include procedures used for checking preservation and indicates where that will be documented; specify that all laboratory records are to be in indelible ink and errors correct with a single line strike through with analyst's initials and the date recorded; sample storage in the laboratory should be described, e.g., not with calibration standards nor with reagents; should address security measures in the laboratory, e.g., coded key pad entry, burglar alarms, etc.; more detail is needed on labeling of calibration materials and reagents (expiration dates, preparation dates, analyst's initials and/or unique identifier referenced in preparation logs to assure traceability); should specify that all old revisions of quality system documents are to be destroyed (only current/in-effect documents available); should stated that the reporting form will be updated anytime there is a change in MDLs or reporting limit; the quality control section should state the essential/minimum QC checks that will be run, there frequency and corrective actions; the forms used for IDC and MDL studies should be included or referenced; more details on microbiology quality control checks, e.g., positive controls should be included; more details are needed describing the scope and procedures for internal assessments; more information should be included on instrument maintenance, including what start up checks will be performed following major repairs; electron data storage should be addressed (e.g., electronic records will be maintained until after peer review and all records to reconstruct analytical results will be output as hardcopy); and it is suggested that a policy be included for instances where standards are used passed their expiration date, e.g., a second source audit should be used that has not expired-this is especially useful for very stable materials such as metals stock solution.

d. The following suggestions for the quality manual are from the National Environmental Laboratory Conference/Program (NELAC/NELAP): should include an ethics policy statement, data integrity policies (e.g., how to report suspected unethical actions) and yearly ethics training; include procedures to insure traceability of reference materials (calibration standards, reference thermometers and reference weights); listing or reference to all laboratory equipment (major and support); procedures for dealing with customer complaints; procedures for correcting laboratory reports once released to customers; procedures for documenting any departures from quality system policies, e.g., issuance of non-conformance forms; frequency for QA Manual review (e.g., yearly with revisions as necessitated by significant change); .

e. The following general suggestions are offered for the laboratory SOPs: The table of contents and fixed uniform format for SOPs are very helpful and should be continued but the SOPs should include a SOP identification number on the front page of all SOPs. The source of all quality control limits should be listed and if not available in the referenced method, could include "professional judgment" with the supporting rationale included; in addition the following sections are suggested (consistent with NELAC/NELAP): applicable matrix or matrices; detection limit; scope and application (including components to be analyzed); definitions; interferences; calibration and standardization (a separate section focused on calibration would be useful instead of just part of Section 7); method performance (good place to list RLs and IDC/MDL results or reference quality system files); pollution prevention; corrective actions for out-of-control data (Section 6 QC does indicate that action must be taken but it does not say what that action it to be); contingencies for handling out-of-control or unacceptable data (Section 6 QC

does indicate that action must be taken but it does not say what that action it to be); waste management; the reference section should routinely include the Lab's QA Manual and the source of the QC limits.

f. It was noted that the LAN and Email service to the laboratory was very slow and adversely impacting efficiency of operations. The source for the problem should be determined (e.g., cable capacity) and corrected.

g. Efforts should continue to have technical training for analysts, e.g., vendor seminars, etc. Training records should be maintained.

K. Recommended Certification Status:

Based upon this on-site assessment, the assessment team recommends the following SDWA certification status:

LEGEND

C – Certified
ND - No Data Submitted
NP - Not Approved
PC - Provisionally Certified
NC - Not Certified
NA - Not Acceptable
AP – Approved
PP – Provisionally Approved
IC - Interim Certified
A – Acceptable

CONTAMINANT	ON-SITE REVIEW	
		Method
Antimony	C	SM 3113B
Arsenic	C	SM 3113B
Barium	C	EPA200.7
Beryllium	C	SM 3113B
Cadmium	C	SM 3113B
Chromium	C	SM 3113B
Copper	C	SM 3113B
Copper	C	SM 3111B
Cyanide	C	SM 4500 CN F
Fluoride	C	EPA300.0
Lead	C	SM 3113B
Mercury	NC	EPA245.1
Nitrate	C	EPA353.2

Nitrite	C	EPA353.2
Selenium	C	SM 3113B
Thallium	NC	EPA200.9
Chloride	AP	EPA300.0
Sulfate	AP	EPA300.0
TDS	AP	SM2540C
Manganese	AP	SM 3111B
Nickel	AP	SM 3113B
Zinc	AP	SM 3111B
Aluminum	AP	SM 3113B
Iron	AP	SM 3111B
Silver	AP	SM 3113B

LEAD AND COPPER RULE:

CONTAMINANT	ON-SITE REVIEW 11/30/99	
		Method
Lead	C	SM3113B
Copper	C	SM3113B
Copper	C	SM 3111B
pH	C	EPA150.1
Conductivity	C	SM2510B
Calcium or Calcium Hardness as $CaCo_3$	C	SM3500 CAD
Alkalinity	C	SM2320B
Sodium	C	SM3111B
Turbidity	C	EPA180.1

L. Inspectors:

Robin Costas 10/24/06

George Long 10/24/06

Joseph Slayton 10/24/06

On-Site Laboratory Evaluation Report (SDWA)

Date of Report: October 24, 2006

Microbiology

Environmental Microbiology Section
Office of Laboratory Services
Bureau for Public Health
West Virginia Department of Health and Human Services
167 11th Avenue
South Charleston, WV 25303

Date of Assessment: September 19-20, 2006

by

David E. Russell

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Office of Analytical Services and Quality Assurance
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A. Introduction:

On September 19-20, 2006, an evaluation of the Environmental Microbiology Section of the West Virginia Office of Laboratory Services, located in Charleston, was conducted to determine the capability of the Laboratory to perform its mission as it relates to the Safe Drinking Water Act. The Laboratory was last evaluated in June, 2003.

The Environmental Microbiology Section (hereafter, the Laboratory) is currently analyzing drinking water for total coliform and fecal coliform (or *Escherichia coli*) using either Multiple Tube Fermentation (MTF) or Colilert. Although not performed routinely, the Laboratory also has the capability to analyze drinking water using Membrane Filtration (MF). In addition, Heterotrophic Plate Counts (HPC), using the pour plate method, are regularly performed, but not on drinking water compliance samples. The Laboratory wishes to maintain certification for all four methods: MTF, Colilert, MF, and HPC. In addition, it seeks certification for the quantitative Colilert method (Quanti-tray) in order to comply with the Long-term Enhanced Surface Water Treatment Rule.

The Laboratory is to be congratulated for the record of PT sample analysis it has established over the past three years. In 2004, 2005, and 2006 the Laboratory successfully analyzed PT sample sets using the MTF, Colilert, and MF methods. All three methods were evaluated each year. In 2005, a PT sample set was analyzed using MF, but mistakenly not reported. The Assessor examined the bench sheet and the final results (from ERA, WS103) and determined that the two were in complete agreement. In addition, the Laboratory successfully analyzed a PT sample using the quantitative Colilert method (Quanti-tray).

The equipment and procedures employed in the bacteriological analyses of drinking water by this laboratory conform with the provisions of the *Manual for the Certification of Laboratories Analyzing Drinking Water*, 5th Edition (2005, U.S. EPA), except as described in Sections C and D below.

B. Personnel:

The following personnel currently analyze drinking water or source water for total coliforms, fecal coliforms, (or *E.coli*), or the heterotrophic plate count.

Tom Ong	Microbiologist Supervisor
Mike Flesher	Microbiologist III
Tracey Goodson	Microbiologist III
Carole Moore	Microbiologist II
Deborah Peters	Laboratory Assistant III

The assessor wishes to thank these individuals for their cooperation and assistance during the on-site evaluation. Tom Ong was especially helpful and generous with his time.

C. General Findings:

General Findings include specific incidences of non-conformance with the equipment and

analytical procedures required by the *Manual for the Certification of Laboratories Analyzing Drinking Water*, 5th Edition (2005, U.S. EPA), or laboratory procedures that, in the opinion of the assessor, jeopardize the generation of valid data.

There are no general findings.

D. Recommendations:

The following remarks are offered as suggestions to help improve the quality and integrity of the data the Laboratory generates. Note that all paragraph numbers and quotes are from Chapter V of the *Manual for the Certification of Laboratories Analyzing Drinking Water*, 5th Edition (2005, U.S. EPA) unless otherwise indicated.

1. The Laboratory's "Water Bacteriological Report" was revised in July, 2006, and a number of improvements were made over the previous version. It now contains extensive information on sample collection and analysis. Particularly noteworthy, are the sample rejection criteria listed on the form, so that in the event a sample is rejected, the reason for rejection is indicated. In some cases a sample may be analyzed even though it failed to meet a required holding time or transport temperature. In such cases a box on the report form labeled "Not valid for SDWA compliance reporting" is checked. The Laboratory is to be commended for this practice. A problem arises, however, when the same results are entered into the Laboratory's computer database (an MS Access database) and the data is sent via the internet to the Environmental Engineering Section of the Office of Environmental Services. The flag noted above ("Not valid for SDWA compliance reporting") is not included. Consequently, there are two reports routinely sent to the Environmental Engineering Section: the paper "Water Bacteriological Report" which contains, when appropriate, the "Not valid for SDWA compliance reporting" qualification, and the electronic report in the MS Access database, sent via the internet, that does not contain the same qualification, when it should. It is the assessor's understanding that the Environmental Engineering Section only reviews the electronic report and not the paper report, which means the qualification indicated on the latter is never actually communicated to the Environmental Engineering Section. Based on conversations with lab personnel, it is clear that the database design is overdue for updating. Unfortunately, the database was developed by a contractor no longer under contract with the Environmental Engineering Section. Nonetheless, it may be possible for state IT personnel to update the MS Access database design. The database needs a comment field in which comments qualifying the results (such as, "Not valid for SDWA compliance reporting") could be placed. In addition, there are difficulties associated with correctly indicating in the database the reason for sample rejection and by whom the sample was collected. Updating the database design should be done with the input of those in the laboratory using the database.

2. Both paragraph 6.3.1 and the Federal Register (40 CFR 141.21(f)(3) footnote 2), in regard to the collection of drinking water samples from distribution systems, state, "Systems are encouraged but not required to hold samples below 10°C during transit." Accordingly, it is recommended that distribution system samples be held below 10°C during transit and that this condition be documented through the use of a temperature blank, the temperature of which would be determined upon arrival at the Laboratory and recorded.

3. According to paragraph 3.4.1, incubator "thermometers should be placed on the top and bottom shelves of the use area". In the Laboratory's incubators, the two thermometers are on adjacent shelves. They should be on shelves well separated from one another (if not the top and bottom shelves) so as to provide a better representation of the incubator's internal temperature. The purpose of the greater spacing is to document that the air temperature is uniform throughout the inside of the incubator.

4. The record of autoclave maintenance is inadequate in that it only consists of a few lines recorded on a clip board kept in the lab. It is recommended that the Laboratory keep copies of the service technician's maintenance reports and a copy of the current autoclave maintenance contract in the autoclave laboratory.

5. Paragraph 5.1.6 lists the information concerning media preparation that should be recorded. It includes "lot number" and the results of checks with "positive and negative" control cultures. The current documentation of media preparation could be improved by recording manufacturer's lot number, and the results of a true negative control check. A negative control is a bacterial species that will not grow in the media or will not produce a positive result. A check for media sterility is an important QC item, but it is not the "negative control" check.

6. Currently, for each control check, a new IDEXX Quanti-cult preparation is used as the source of the control bacteria, and subsequently discarded. A stock culture (agar slant) is used as the source of *Proteus mirabilus*, a non-lactose fermenter; however, the purity of this culture is not periodically checked as recommended in paragraph 5.1.6.4. The Laboratory should perform this check periodically, record the results, and take corrective action if necessary.

7. The Laboratory should consider requiring the use of UV-absorbing safety glasses when laboratory personnel use the UV lamp to evaluate Colilert tests. Such safety glasses are currently not used.

8. According to paragraph 4.4.3 each lot of commercially-prepared dilution water should be checked for sterility. The Laboratory checks laboratory-prepared media and dilution water for sterility, but not commercially-prepared dilution water. Sterility checks of each new lot of commercially-prepared dilution water should be initiated and recorded.

E. General Comments:

1. The Laboratory has done an excellent job of updating, once again, the Water Bacteriological Report, incorporating all the requirements listed in paragraph 6.5 and many recommendations from prior on-sites evaluations. The report form serves to document and communicate key information. The updated form is a good example of the Laboratory's commitment to continuous improvement.

2. The Laboratory is also to be commended for the routine practice of rejecting samples (without analysis) for the reasons listed on the Water Bacteriological Report.

3. The Laboratory is to be further commended for the extensive QC performed and documented, much of which is done at a frequency greater than that required by the SDWA Manual.

F. Conclusions:

The Laboratory's management and staff are to be commended for their dedication to maintaining high standards in microbiological analysis and remaining committed to continual improvement. As shown in the table below, full certification will be recommended for Colilert (presence/absence and quantitative techniques), Multiple-Tube Fermentation, Membrane Filtration, and Heterotrophic Plate Count.

G. Certification Status (Recommended by the Certification Officer):

TECHNIQUE	METHOD[1]	CERTIFICATION STATUS
ONPG-MUG Test (Colilert - Presence/Absence)	SM 9223	Certified
ONPG-MUG Test (Colilert - Quantitative)	SM 9223	Certified
Fermentation	SM 9221B,E	Certified
Membrane Filtration	SM 9222B	Certified
Heterotrophic Plate Count	SM9215B	Certified

H. Assessor:

David E. Russell
Microbiological Assessor

[1] *Standard Methods for the Examination of Water and Wastewater*, 20th Edition.

SDWA Lab Certification Program:
On-Site Review

Rev. 10-24-06

West Virginia Department of Health and Human Resources
Bureau for Public Health
Office of Laboratory Services
Environmental Chemistry Laboratory Section
167 11th Avenue
South Charleston, WV 25303

On-Site September 20-22, 2006

Survey by

George Long
Joseph Slayton

U.S.E.PA. - Region III
Analytical Services and Quality Assurance Branch
701 Mapes Road
Ft. Meade, Maryland 20755-5350

Introduction:

On September 20-22, 2006 an on-site review was conducted of the West Virginia's SDWA Laboratory Certification Program of the West Virginia Department of Health and Human Resources, Bureau of Public Health, Office of Laboratory Services. Laboratory SDWA certifications for chemistry are conducted by Larry Duffield, Chemistry Program Manager I (organic and inorganic chemistry Certification Officer-CO), Greg Young, Chemist II (organic and inorganic chemistry CO) Patrick Marchio, Chemist I (inorganic chemistry CO) and Rebecca Hill, Office Assistant II (application processing, records/data base table and file tracking). Laboratory SDWA certifications for microbiology are conducted by Thomas Ong, Microbiologist Program Manager, Tracy Goodson, Microbiologist III, Michael Flesher, Microbiologist III and Rebecca Hill, Office Assistant II (application process, maintains chemistry certification records). Charlotte Billingsley, Associate Director oversees the Laboratory Certification Program and reports directly to Andrea Labik, Director Office of Laboratory Services.

The laboratory certification program is in support of the WV Office of Environmental Health Services (OEHS).

Reciprocity is not part of the WV SDWA code as the WV certification program retains the option to inspect any laboratory certified by the State.

In addition, to commercial laboratories, the WV laboratory certification program reviews and certifies a satellite laboratory to the WV Laboratory Servies for microbiology (Kearneysville, WV).

This review was conducted through interviews, laboratory records/file review, review of program Standard Operating Procedures (SOPs) and a joint inspection with the WV Laboratory Certification Program.

This program assessment was conducted by George Long, Chemist and Joseph Slayton, Technical Director, USEPA, Region III, Analytical Services and Quality Assurance Branch, 701 Mapes Road, Fort Meade, Maryland 20755-5350. This review was based on the requirements listed in the Manual for the Certification of Laboratories Analyzing Drinking Water, Criteria and Procedures Quality Assurance, EPA 815-R-05-004, January 2005.

Program Overview & Observations:

The WV Laboratory Certification Program is based upon the Manual for the Certification of Laboratories Analyzing Drinking Water, Criteria and Procedures Quality Assurance, EPA 815-R-05-004, January 2005. and upon the 40 CFR Part 141-143 SDWA requirements, as well as, upon the requirements listed in the analytical methods referenced in these documents. This includes the requirement that laboratories successfully analyze at least one proficiency testing sample per analyte per method per year. All in-state laboratories are also to have procedures and documentation, which are found satisfactory by an on-site inspection by State COs at least once every three years. All of the WV SDWA COs are trained professionals with years of laboratory experience.

A number of innovations have been implemented to streamline and improve the program including:

- Development of numerous certification status tracking tables (e.g., Laboratory Certification Status Review Sheet, Laboratory Certification Tracking Sheet, and PT tracking spreadsheet);
- automated tools (e.g., automated microbiology onsite announcement letter);
- the "Chemistry Proficiency Testing Water Study Enrollment Form" to help close a possible vulnerability with the Agency's PT program in that laboratories could pick and chose among the studies reported to a State Certification program.
- presurvey forms to better gather background information prior to an assessment. These are very user friendly and EPA Region 3 plans to use the forms for its program.
- the WV web site listing current laboratory SDWA certification status is a great tool and is being kept up to date.

In addition, the certification program has good documentation of procedures with chemistry and microbiology certification SOPs (additional details listed below).

Given that analyses performed by commercial laboratories represent a significant portion of the WV's SDWA monitoring program, on-site reviews and certifications of commercial laboratories are very important in helping assure the quality of drinking water in West Virginia.

Personnel/Training/Vacancies:

Since the last oversight review performed by EPA in 2003, an additional chemist has completed the EPA COs training course (Patrick Marchio). Currently the WV program has two chemistry COs certified for inorganic and organic chemistry and one CO for inorganic chemistry. Unfortunately, the loss of organic analysis capability from the Environmental Chemistry section in 1997 has not made it possible for the chemistry COs to gain hands-on experience with the SDWA methods for organics. As a result, the review of SDWA organic procedures requires methods review and preparation of checklists by the COs as part of the preparation for assessments. Also, Martha McElfresh, recently hired for the Environmental Chemistry Laboratory Section, has experience performing organic analyses and will be a helpful resource for the assessors.

The Microbiology section has also gained an additional CO since the last program review (Michael Flesher).

As part of the on-the-job-training of new COs, they performed inspections jointly with the more experienced COs.

Certification Program Documentation:

The WV laboratory microbiology certification program has developed an SOP entitled: "Drinking Water Certification Program-Microbiology" (revision 8/21/01). This document

includes the following topics: Introduction (cites various supporting federal regulations and the use of the EPA Lab Certification Manual as the focus for the WV Microbiological program); Laboratory Certification Officer (qualifications); Certification Parameters; Certification Renewal (table listing forms, mailing label files, etc.); On-site Evaluations (checklists, procedures, reports, follow-up, etc.); Adding a Certified Laboratory (In-State); Adding a Certified Laboratory (Out-of-State); Performance Evaluation Samples; Records Retention and Storage; Drinking Water Laboratory Certification Renewal (form); Laboratory Information Form: Drinking Water Laboratory Certification Renewal *FINAL NOTICE* (form); Drinking Water Certificate; Water Survey Schedule (template to track projected on-site inspections); Presurvey Package (cover letter and pre-survey form); On-site Inspection Report (template); On-site Evaluation Checklist; Follow-up Letter (reminder notice template for response to the on-site inspection); Follow-up Letter (2) (template for responses that were not acceptable); tracking chart for on-site evaluations (tracking corrective actions and correspondence associated with on-site inspections); Application for Laboratory Certification (form); Letter in Response to Out-of-State applications (Note: includes WV's approach to "Reciprocity"); Letter Noting Receipt of Application (form letter); Key to List of Approved Tests (the WV Laboratory Certification Program groups analytes for certification); and a "Listing of Labs Certified in WV" (listed by analyte groups for both Microbiology and Chemistry).

The SOP for WV's Environmental Chemistry has been updated since the last on-site assessment. The Standard Operating Procedure for Environmental Chemistry Drinking Water Laboratory Certification Program (June 2005) includes: Scope; certified laboratory list; fees for certification, certification status designations; laboratory quality assurance plan; standard operating procedure; corrective action reports for unacceptable PTWS; laboratory evaluation process; office of environmental health services reporting policy; trace metals; inorganics; organic pesticides; organic herbicides; organics; trihalomethanes (THM); organics volatile organic compounds (VOC); haloacetic acids (HAA5); synthetic organic compounds (SOC); organization charts; process flow charts; WV certified analytes for drinking water; renewal and out-of-state certification application; pre-surevey packet for on-site audit; proficiency testing water study tracking spreadsheet; laboratory status sheet; chemistry proficiency testing water study enrollment.

The QA Manual for the Office of Laboratory Services serves as the core/umbrella quality system policy document for laboratory operations, as well as, the laboratory certification program.

Laboratory Certification Records Management:

The documentation for the Microbiology and Chemistry Certification Program was complete and well organized. These records allowed the review of PT data, on-site reports, corrective actions and certification status and official communications. The records of out-of-state laboratories and PT records for microbiology would benefit from clerical support. The PT program is well documented and the laboratories have been officially notified of the schedule and procedures (both microbiology and chemistry). Schedules of PTs and on-sites and certification issuance are tracked and organized in tabular form. Continued leadership by the Associate Director and administrative assistance/clerical support have significantly improved records management in the chemistry certification program.

On-site Laboratory Inspections:

The EPA assessment team observed the on-site assessment of the West Virginia American Water Company (WVAWC) by Tom Ong and Mike Flesher. The inspectors effectively utilized a checklist for microbiology and the inspection was thorough and professional. Technical advice and assistance was provided to help Tom Holbrook, WVAWC Laboratory Director, to resolve an issue with possible contamination of Colilert bottles. Also, a "QC quick list" /QC summary for colilert will be provided to the laboratory to be used for future self-reviews.

All required on-site assessments and follow-up corrective actions and communications have been completed for chemistry and microbiology.

The program issues certificates (hardcopy) each year which include method and analytes. The target date is the first day of the new year.

Consistent with the Federal Register, the WV certification program does not include certification or approval for laboratories for the following analytes: turbidity, pH, silica, PO4, conductivity, TOC, SUVA, calcium/hardness and alkalinity.

Findings:

None.

Recommendations:

The following suggestions are offered for the continuous improvement of the program.

a. Efforts should be continued to clean-out older files in microbiology file cabinets to make room to allow organization and filing of out-of-State microbiology laboratory certification records (same organization/records management as for in-state laboratories).

b. Clerical help is needed in the microbiology section. Valuable time of professionals is spent filing and organizing the many records associated with laboratory certification, microbiological analysis records, and bottle requests.

c. Efforts to unify the chemistry and microbiology programs should be continued, e.g., currently there is a joint application form "Application for laboratory certification for drinking water analyses in conformance with EPA Safe Drinking Water Act", which are processed at the Big Chimney location. Significant synergy may be gained by joint efforts, e.g., the status table (the "big board") used for chemistry certifications has proven as an effective reinder tool and may be of use to the microbiology as well. The microbiology program should consider utilizing the "PT enrollment Form" developed for chemistry PTs.

d. The chemistry PT records are tracked on a spread sheet. The microbiology records are as a collection per year in a single file. The microbiology PT records should be organized to allow easier review.

e. The following are suggestions for the certification program SOP/s: should include more details on records management, e.g., how the laboratory files are organized/arranged, length of time records are retained (p. III-8 of CLADW suggests at least 6 years), archive procedures including labeling and/or discarding outdated records, document control numbers for laboratory files); add a description of the certification status tracking ("board") and/or reminder calendar; describe the certificate code system including "M" and "C" designation; and describe the use of method checklists as a tool for the chemistry assessors.

f. Electronic files are suggested for PT records especially for microbiology. A high speed scanner may be helpful..

g. A minimum frequency should be set to review the certification program SOP/s (e.g., yearly) with formal revisions as needed. This should be added to the QA Manual as a laboratory certification policy.

h. A schedule for routine update of the Web site listing of laboratory certification status should be set (e.g., March of each year). Also a target turn-around for other individual laboratory updates that occur during the year should be set (e.g., 30 days). This should be added to the QA Manual as a laboratory certification policy.

i. The program SOP/s should include a reference section that includes the EPA Laboratory Certification Manual, supporting State code and also the Office of Laboratory Services's Manual of Quality Assurance.

j. The certification program should provide guidance to WV laboratories on laboratory ethics/data integrity.

k. The certification program should share accomplishments with its OEHS customer, e.g., continuous improvement of program documentation, status tracking and ourtreach efforts.

l. The tracking table (" big board") should backed up electronically.

m. The certificate of completion from EPA's Cerfication Officer training course was missing from the file for Tracy Goodson. Another copy should be obtained.

Summary:

WV has a good program for the SDWA laboratory certification that keeps on track with the required schedule of on-site assessments, assessment reports and follow-up, as well as, with PT tracking and follow-up. Certificate issuance provides the necessary information for updating of the WV web site (laboratory's certification status), which is kept current to accurately reflect certification status of laboratories. Parameter attachments to the issued certificates are method

by method and analyte by analyte.

EPA Assessors:

George Long 10/24/06

Joseph Slayton 10/24/06

Membrane Filtration - Total Coliforms (100 mL)

I. Introduction -

Membrane Filter Technique is a method used for detecting coliform bacteria in wide variety of water sample types. It is based on passing a volume of water through a 0.45µm "membrane" filter to "catch" the coliform bacteria and then incubating the filter on the appropriate media. When using this method, coliform bacteria is defined as facultative anaerobic, gram-negative, non-spore-forming, rod-shaped bacteria that develop red colonies with a metallic (golden) sheen within 24 hours at 35°C on an Endo-type medium containing lactose. Some of the coliform colonies may appear as dark red, mucoid or nucleated without a metallic sheen.

Currently, the laboratory is not utilizing this method for compliance samples. The method is used only as a back-up to Multi Tube Fermentation Method and the Chromogenic/Fluorogenic Substrate Test (Colilert).

II. Sample Requirements -

1. Maximum allowable elapsed time between sample collection and analysis is 30 hours.

2. Sample must be chlorinated.

3. Sample must be from a public water system that has a P.W.S. I.D.# beginning with "330".

4. Samples are to be rejected for any of the following reasons:

   A. Insufficient air space to facilitate mixing.
   B. Sample contains residual chlorine.
   C. Sample exceeds maximum allowable time requirements.
   D. Information on the Water Bacteriological Report Form (EM-1) is insufficient. (No date or time of collection)
   E. Insufficient sample volume (< 97.5 mL).
   F. Sample container was not furnished by the Office of Laboratory Services.

III. Sample Types -

This method is not currently in use at the laboratory. However, since the Environmental Microbiology Section is the drinking water Certification Authority for the state and membrane filter is a method that is being used in other state certified laboratories, the

Environmental Microbiology Section is maintaining this method as a certified procedure. This method will only be used as a back-up to Multi Tube Fermentation and Chromogenic/Fluorogenic Substrate Methods.

1. Public drinking water samples that meet the requirements listed in Section II above.

IV. Reagents and Equipment -

Reagents:

1. m-Endo LES Agar
2. Brilliant Green Bile Broth 2%
3. Lauryl Tryptose Broth
4. EC Medium
5. 95% EtOH (not denatured)
6. Sterile, Buffered Rinse Water

Equipment:

1. Vacuum Pump
2. 2 Vacuum Flasks
3. Filtration units (autoclavable plastic, magnetic consisting of funnel and base)
4. 0.45 µm membrane filters
5. Petri Dishes (15 X 60 mm, loose lid)
6. Forceps (non-corrugated tips)
7. Rinse Bottles
8. Sealable Plastic Container 12" X 8.5" X 5.5" (LxWxH)
9. Cheese Cloth
10. Wax Buckets
11. 1 oz. Nalgene Bottle
12. Permanent Marker
13. 10X Stereo Scope
14. Fluorescent Light Source
15. Sterile Cotton Swabs

V. Procedure -

Set-Up -

1. Cut a piece of cheese cloth, wet with tap water and wring out so that it remains

damp. Place this in the sealable plastic container and place on the table in the 35.0 ± 0.5°C Walk-In Incubator. Size of the cheese cloth varies, depending upon the number of samples. The cheese cloth should be long enough to set the stacked petri dishes on and still have enough to fold over the stack of petri dishes.

2. Rinse bottles are stored with about 1" of 70% EtOH in them to keep the bacterial growth down. Pour the EtOH from the rinse bottle into the glass stoppered bottle. Pour an inch or two of rinse water into the rinse bottle, cap, shake and squeeze the rinse bottle into a wax bucket to remove the EtOH residue, then pour the remaining rinse water from the rinse bottle into the wax bucket. Fill the rinse bottle to the fill line with rinse water. Just prior to analyzing the samples, dip the tip of the rinse bottle into the EtOH in the glass-stoppered bottle (tilting the glass-stoppered bottle so that the tip of the rinse bottle is submerged in the EtOH). Squeeze the rinse bottle to expel rinse water into the wax bucket to rinse the EtOH from the tip.

3. m-Endo LES agar is prepared by the Media and Glassware Preparation Unit and is stored in sealed plastic container in the Walk-In refrigerator in the Milk Room for no longer than 2 weeks. Obtain the appropriate number of m-Endo LES agar petri dishes. One plate for each sample plus five control plates plus a rinse plate for every 11 samples. Label the plates with a permanent marker (Sharpie®) on the lid (do not label the bottom of the plate containing the agar). Label the plates as follows:

"Media"	This is the media control and is incubated as is.
"Filter"	This plate contains only a sterile filter and is used as the filter sterility control. A sterile filter is removed from the package and placed directly onto the m-Endo LES agar.
"Pre"	This plate is used to check the sterility of the filtration apparatus (funnels). A sterile filter is placed on the base and the magnetic funnel is attached. About 20 - 30 mL of sterile rinse water from the rinse bottle is added to the funnel and then the vacuum is turned on. The funnel is rinsed with 3 over-lapping rinses then the filter is place on the m-Endo LES Agar in the "Pre" petri dish.
"Post"	Same procedure as the "Pre", only this is done after the last sample.
"Sample # R"	Same procedure as the "Pre" and "Post". This plate is done after every 11 samples to ensure there is no "carry-over" occurring. (This is done after the 8th sample on the first run only.)
"+" Control	The very last plate. The filtration apparatus is filled with 20 - 30 mL of Rinse Water and 0.5 mL from a stock culture of *E. coli* is added then filtered.
"Sampel #"	Label this plate with just the sample number.

4. Unwrap the pre-sterilized filtration apparatus being careful not to touch the inside of the funnel or the top of the base where the filter sets.

5. Have a bunsen burner turned on and the forceps placed in the 1 oz nalgene bottle with 95% EtOH.

6. Place the base of the filtration apparatus in the vacuum funnel.

7. Carefully remove a sterile filter by pealing the cover back from the corner while slightly bending the filter (this helps separate the blue top and bottom cover of the filter). Flame the forceps and remove the filter from the pouch (using the flamed forceps) and place it on the filtration apparatus' base, grid side up. Place the forceps back into the 1 oz nalgene bottle containing EtOH and place the magnetic funnel top onto the base.

Sample Analysis -

1. Run the "Media", "Filter" and "Pre" controls listed in "Set-Up" Item #3. Sterile filters are placed on the base of the filtration apparatus before each sample or control plate is done using the technique described in "Set-Up, Item #7". Filters are removed by removing the magnetic funnel (top), shaking off the excess water, and lying it on it's side on a ring clamp or paper towel (careful not to touch the bottom or the inside). Turn off the vacuum by turning the valve on the rubber tubing that leads to the vacuum flask. Flame the forceps and use them to slowly "peal-off" the filter from the base. Using a "rocking motion", place the filter on the surface of the m-Endo LES agar. Ensure that the filter is flat on the agar surface and that there are no air bubbles within the filtration area of the filter.

2. With the filtration apparatus set up and a sterile filter in place, shake the sample 25 times in 7 seconds with a 1 foot movement. Pour the sample into the funnel up to the 100 mL indicator mark.

3. Turn on the vacuum by turning the valve on the rubber tube that leads to the vacuum flask. The 100 mL of sample will then be pulled (filtered) through the 0.45 μm filter.

4. After the sample has been completely filtered, rinse the funnel 3 times with the rinse bottle. The stream of rinse water should be kept high on the funnel (at least 1" form the top). Each rinse must be overlapping, approximately 450° (Start the rinsing stream at one point on the funnel and continue in a circular motion back to the starting point and then about a quarter of a turn more). Let each rinse completely drain before starting the next.

5. Remove the filter as described in "Sample Analysis, Item #1" and place it in the appropriately labeled petri dish.

6. After the 8th sample on the first run and every 11 samples thereafter, a rinse is performed by filtering only rinse water from the rinse bottle as described in "Set-Up, Item #3, "Pre".

7. Plates must be put in the incubator within 10 minutes of placing a filter on them. Plates are stacked 6 high. When a stack of 6 is complete, place them upside down on the moist cheese cloth in the tight sealing plastic container in the "Walk-In" Incubator.

8. After the last sample is filtered, a "Post Rinse" is done. It is the same procedure as any other rinse with the exception that it is the last one.

9. After the post rinse, if nothing else is to be analyzed, a positive control is done. The procedure is the same as a rinse with the exception that 0.5 mL of a stock culture of *E. coli* is pipetted into the 20 - 30 mL of rinse water before the vacuum is turned on.

10. The follow represents how plates would be labeled and stacked in the incubator for samples numbering from 560 to 586:

562	567 R	573	578 R	584	
561	567	572	578	583	
560	566	571	577	582	"+Control"
"Pre"	565	570	576	581	"Post"
"Filter"	564	569	575	580	586
"Media"	563	568	574	579	585

11. After the last stack is placed in the incubator, the moist cheese cloth is unfolded over the plates and the lid is sealed on the container. A strip of making tape is placed on the lid and labeled with the Date, Time and Analysts Initials. The container is then placed on one of the shelves containing a thermometer for 22 to 24 hours.

Reading and Interpreting -

1. After 22 - 24 hours at 35.0 ± 0.5°C remove the container and examine the petri dishes under the stereo scope (10X magnification) with the petri dished tilted towards the fluorescent light source.

2. Record counts as follows:

Observation	Record	Action
No colonies appear	Record count as "0"	Report as Total Coliform Absesnt (< 1)
Metallic green or dark red colonies appear	Count and record the total number of colonies. If >200 appear, record as "TNTC". If the growth of bacteria is a sold mass, report as "Confluent Growth"	These are suspect for coliform bacteria and must be subject to the verification procedure
Red colonies appear	Count and record number of colonies. If >200 appear, record as "TNTC". If the growth of bacteria is a sold mass, report as "Confluent Growth"	These may be atypical coliform colonies and must be subject to the verification phase.
Light Pink or Clear colonies appear	If < 200, record count as "0" If > 200, report as "TNTC"	< 200 report as Total Coliforms Absent. If >200, Report as "Invalid - TNTC". These may be subjected to the verification phase.
Foreign Matter appears on the filter (iron, dirt, grit or sand, etc.)	Record as "Particulate Matter"	Report as "Invalid - Particulate Matter". May be submitted to the verification phase.

Verification -

1. Obtain the plates that are subject to the verification phase (listed in the table above). Each plate requires one tube of EC Medium (EC), one tube of Single Lauryl (SL) and one tube of Brilliant Green Bile Broth (BG). For the SL and BG tube, label the glass tube with the sample number using a wax pencil. For the EC tube, label the metal lid with the sample number using a wax pencil.

2. Aseptically remove a sterile swab from the glass containers, careful not to drag the cotton tips over the exposed ends.

3. Using the sterile swab, wipe the entire surface of the filter, removing all of the growth. Since the test is based on a "Presence/Absence" concept, picking individual colonies is not necessary. If counts were to be reported, then individual colonies would have to be picked.

4. Innoculate a tube of EC, SL and BG (in that order).

5. Place the SL and BG tubes in the 35.0°C Walk-In Incubator for 48 ± 3 hours (checking for gas production in 24 ± 2 hours) and the EC tube in the 44.5°C Fecal Bath for 24 ± 2 hours.

6. Gas Production in the BG tube verifies the presence of Total Coliform Bacteria. Gas Production in the EC tube verifies the presence of Fecal Coliform Bacteria. If gas is produced in the SL and not the BG or EC, then using a sterile swab, re-innoculate a BG and EC tube. Gas in the EC tube but not the BG tube is still considered Total Coliform Positive (this is extremely rare). No gas production in any of the tubes does not rule out the presence of coliform bacteria. See the "Reporting" Section

Reporting -

Original Observation	Verification Result	Report
<200 Metallic Green and/or Dark Red Colonies	Gas Production in BG Gas Production in EC No Gas Production in BG No Gas Production in EC	Total Coliform Present Fecal Coliform Present Total Coliform Absent Fecal Coliform Absent
>200 Metallic Green and/or Dark Red Colonies	Gas Production in BG Gas Production in EC No Gas Production in BG No Gas Production in EC	Total Coliform Present Fecal Coliform Present Invalid - TNTC Invalid - TNTC unless Gas Production in BG, then Total Coliform Present, Fecal Coliform Absent
< 200 Red Colonies	Gas Production in BG Gas Production in EC No Gas Production in BG No Gas Production in EC	Total Coliform Present Fecal Coliform Present Total Coliform Absent Fecal Coliform Absent
> 200 Red Colonies	Gas Production in BG Gas Production in EC No Gas Production in BG No Gas Production in EC	Total Coliform Present Fecal Coliform Present Invalid - TNTC Invalid - TNTC unless Gas Production in BG, then Total Coliform Present, Fecal Coliform Absent
> 200 Clear or Pink Colonies	Gas Production in BG Gas Production in EC No Gas Production in BG No Gas Production in EC	Total Coliform Present Fecal Coliform Present Invalid - TNTC Invalid - TNTC unless Gas Production in BG, then Total Coliform Present, Fecal Coliform Absent
Foreign Matter appears on the filter (iron, dirt, grit or sand, etc.)	Gas Production in BG Gas Production in EC No Gas Production in BG No Gas Production in EC	Total Coliform Present Fecal Coliform Present Invalid - TNTC Invalid - TNTC unless Gas Production in BG, then Total Coliform Present, Fecal Coliform Absent

VI. Quality Control

1. If any of the control plates show signs of contamination ("Media", "Filter", "Pre", "Post" or any "Rinse"), the affected samples are to be reported as "Laboratory Accident" and replacements samples are requested.

2. Lot Numbers of filters are recorded when received and put into use. (Attachment #1)

3. Monthly, 2 to 3 analysts count the same membrane (containing 20 to 80 colonies). Counts must agree within 10%. (Attachment #1)

4. Monthly, an *E. coli* positive sample is taken through the verification phase. (Attachment #1)

Multi Tube Fermentation (100 mL)

I. Introduction -

Multi Tube Fermentation is the standard test used by the laboratory for detecting total coliform and fecal coliform bacteria in drinking water compliance samples. The historical definition for the coliform group of bacteria has been based on the method used for detection. When using the fermentation test, the coliform group of bacteria is defined as all facultative anaerobic, gram-negative, non-spore-forming, rod-shaped bacteria that ferment lactose with gas and acid formation within 48 hours at 35°C. For drinking water compliance samples the laboratory uses a single 100 mL sample portions and because of the potential problems associated with gas bubbles in large inverted tubes, the gas vials are replaced with bromcresol purple (0.01 g/L). The test consists of two phases - presumptive and confirmation and can take anywhere from 48 to 96 hours for completion.

II. Sample Requirements -

1. Maximum allowable elapsed time between sample collection and sample analysis is thirty (30) hours.

2. Reject samples for any of the following reasons:

   A. Sample exceeds 30 hours.
   B. Information on the Water Bacteriological Report Form (EM-1) is insufficient. (No date or time of collection)
   C. Insufficient Sample Volume. (< 97.5 mL)
   D. Sample contains residual chlorine.
   E. Insufficient air space to facilitate mixing of sample.
   F. Sample container was not furnished by the Office of Laboratory Services.

III. Sample Types -

1. Drinking water compliance samples ~~only~~.
2. Back-up method for all other drinking water samples and pools.

IV. Reagents and Equipment -

Reagents

1. Lauryl Tryptose Broth (double strength with 0.01 g/L Bromcresol Purple). Prepared by the Media Preparation Section in 250 mL screw cap culture bottles (Corning or Wheaton) and stored in the dark in the cabinets in the water room for

no longer than three months at room temperature (<30°C).

2. Brilliant Green Bile Broth. Prepared by the Media Preparation Section in 20 x 150 mm screw cap culture tubes and stored in the dark in the cabinets in the water room for no longer than three months (loose lid tubes stored no longer than 2 weeks) at room temperature (<30°C).

3. EC Medium. Prepared by the Media Preparation Section in 20 x 150 mm screw cap culture tubes and stored in the dark in the cabinets in the water room for no longer than three months (loose lid tubes stored no longer than 2 weeks) at room temperature.

Equipment

1. 35.0 ± 0.5°C Incubator. (Walk-In or Environette)
2. Sterile Cotton Swabs.
3. Metal Racks and Baskets.
4. Culture Tube Racks.
5. Wax "Chicken" Buckets.
6. Tare Bottle with 100.0 ± 2.5 mL range indicated.

For Quality Control

1. 10^{-8} Stock of *E. coli*
2. Slant of non-lactose fermentating *E. coli*
3. (3) 100 mL Sterile Water Samples.
4. Inoculating Loops

V. Procedure

Note: All data for the presumptive and confirmation phase is to be recorded on the MTF work sheet (Attachment #1) in the MTF Records Records Book.

Presumptive Phase

1. Shake sample 25 times in 7 seconds with a 1 foot movement and pour off excess so that only 100 ± 2.5 mL remains. (Use tare bottle.)

2. Pour 100 mL of sample into culture bottle containing 100 mL of double strength lauryl tryptose broth containing bromcresol purple.

3. Place inoculated culture bottle(s) into metal rack (holds 30 samples) or metal basket (holds 6-7 samples) and place in a 35.0 ± 0.5°C incubator (Walk-In or

Environette) for 48 ± 3 hours on the 24 hour shelf.

4. Check cultures in 24 ± 2 hours. If culture(s) are clear purple (negative) or cloudy purple (Turbid), move to the 48 hour shelf. If culture(s) are yellow (Presumptive Positive), remove from the incubator and obtain the corresponding Water Bacteriological Report Form (EM-1). Record a "+1" in the "p/a24" column. Place the corresponding Water Bacteriological Report Form, EM-1 into the 24 Hour BG box. The sample is now ready for the Confirmation Phase.

5. After 48 ± 3 hours of incubation, remove remaining cultures from the incubator. Cultures that are clear purple are negative for total coliform bacteria. For the negative cultures, record the date they are read in the "rpt date" column and the analysts initial's in the "init" column. Also, record the time read out to the side of the last column. Note, the report date and initials can be recorded in the top of the column and lines drawn down. The sample is now ready for reporting.

   If a culture is cloudy purple (turbid), set it aside, locate the corresponding EM-1 form and place it in the 24 Hour BG box and record a "T" in the "P/A48" column. The sample is now ready for the Confirmation Phase.

   If a culture is yellow, set it aside, locate the corresponding EM-1 form and place it in the 24 Hour BG box and record a "+1" in the "P/A48" column. The sample is now ready for the Confirmation Phase.

   Confirmation Phase

6. For each presumptive positive sample (yellow and turbid cultures) submitted for the Confirmation Phase, obtain one tube containing EC Medium (EC) and one tube containing Brilliant Green Bile Broth (BG). Label each tube with the laboratory number as follows: using a wax pencil, label the glass BG tube with the sample number and label metal lid of the EC tube with the laboratory number. (The lid of the EC tube is numbered because the tube is placed in a water bath and if the glass tube is numbered, it may wash off.)

7. Mix the presumptive positive culture by swirling it. Using a sterile swab, dip into the presumptive positive culture and then transfer into EC and then into BG (in that order). Record the time of the transfer in sample log book at the bottom of the appropriate column (p/a24 or P/A48).

8. Place the BG tube on the 24 Hour BG shelf in the 35.0 ± 0.5°C Walk-In Incubator and place the EC tube in the 44.5 ± 0.2°C Fecal Water Bath.

9. After 24 ± 2 hours remove the EC tubes from the Fecal Water Bath and gently

swirl to dislodge any gas bubbles. Gas in the inverted gas vial is considered a fecal coliform positive and is to be recored as a "+1" in the "fc data" column. Clear tubes with no gas and turbid tubes with no gas are considered negative for fecal coliform and are to be recorded as "-1" in the "fc data" column. Fecal coliform positive samples are to recorded as "Pres" in the "fecal rp" column.

10. After 24 ± 2 hours the BG tubes are to be removed from the 24 Hour BG shelf and examined for gas production. If there is no gas in the inverted vial, record as "-1" in the "conf/c" column and place back into the Walk-In Incubator on the 48 Hour BG shelf for another 24 hours (total time in BG is 48 ± 3 hours). Place corresponding EM-1 form into the 48 Hour BG Box.

    If there is gas in the inverted gas vial then the sample is confirmed as total coliform positive. Record a "+1" in the "conf/c" column and "Pres" in the "total" column. Record the report date in the "rpt date" column and analysts initials in the "init" column. Also, record the time to the right of the "init" column. The sample is now ready for reporting.

11. After 48 ± 3 hours, remove all BG tubes from the Walk-In and examine for gas production. If there is gas in the inverted gas vial, then the sample is confirmed as total coliform positive. Record a "+1" in the "conf/48" column and "Pres" in the "total" column. Record the report date in the "rpt date" column and analysts initials in the "init" column. Also, record the time to the right of the "init" column. The sample is now ready for reporting.

    If there is no gas in the inverted gas vial, then the sample is considered Invalid. record a "-1" in the "conf/c" column and "Inv" in the "total" column. Record the report date in the "rpt date" column and analysts initials in the "init" column. Also, record the time to the right of the "init" column. The sample is now ready for reporting.

Reporting

12. After analysis is complete and the data is recorded in the log book, the corresponding EM-1 forms must be completed. For samples that are negative for total coliform, record an "X" in the in the "Total Coliform Absent" Box on the EM-1 form.

    For samples that are total coliform positive, record and "X" in the "Total Coliform Present" Box on the EM-1 form. Then record the fecal coliform results by placing an "X" in the appropriate "Fecal Coliform" Box (either Present or Absent). If a sample is "Present" for total coliform, then there must be a result for fecal coliform.

For invalid samples, those that did not produce gas within 48 ± 3 hours in Brilliant Green Bile broth, place an "X" in the "Invalid" box, an "X" in the "Turbid" box and an "X" by the "Send Replacement Sample"

13. After all EM-1 forms are marked, they are to be placed in the "To Be Checked" Basket.

14. A Microbiologist II or higher then will check the EM-1 forms against the log book for precision and accuracy and will initial all total coliform positive results in the log book to the right of the last column.

15. If a sample is submitted for compliance with the Safe Drinking Water Act (SDWA) and is positive for total coliforms, the EM-1 form is pulled by the analyst checking the forms and marked with a "post-it"note indicating that it is to be faxed to the Office of Environmental Health Services - Environmental Engineering Division. These forms are immediately faxed by the staff of the General Reporting Office.

16. All EM-1 forms are then taken to the General Reporting Office where they are sorted, faxed, mailed and stored.

VI. Quality Control

Each batch of laboratory prepared media must be checked before use with positive and negative controls.

1. When media is delivered from the Media & Glassware Preparation Unit, pull 4 samples from each batch (double strength lauryl tryptose broth, brilliant green bile broth and EC Medium).

2. Label as follows: 1 bottle/tube "-" (Negative Control), 1 bottle/tube "NLF" (non-lactose fermenting E. coli) and 2 bottles/tubes "+" (Positive Control - *E. coli*).

For 100 mL Double Strength Lauryl Tryptose Broth:

3. Obtain four 99 mL dilution blanks per batch. Label as in Step #2. Add nothing to the "-" dilution blank, add one loopful of NLF (from a slant) to the dilution blank labeled "NLF" and add 0.5 mL of 10^{-8} stock of *E. coli* to each dilution blank labeled "+".

4. Shake each dilution blank and add to the appropriate labeled culture bottle and incubate as outlined in the procedure above above.

5. Record Results on QC Form (Attechment #2).

For Brilliant Green Bile Broth and EC Medium:

6. Add 0.5 mL of 10-8 stock culture of E. coli to tubes labeled "+", add a loopful of non-lactose fermentating *E. coli* to the tube labeled "NLF" and add nothing to the tube labeled "-".

7. Incubate as outlined in the procedure in Section V above.

8. Record results on QC Form (Attachment #2).

Attachment #1
MTF Bench Sheet

Attachment #2
Media Productivity and Sterility Checks

Joe
Slayton/ESC/R3/USEPA/US
08/31/2006 03:53 PM

To Dave Russell/ESC/R3/USEPA/US@EPA
cc George Long/ESC/R3/USEPA/US@EPA
bcc
Subject Fw: Requested Documents

----- Forwarded by Joe Slayton/ESC/R3/USEPA/US on 08/31/2006 03:47 PM -----

Tom Ong
<tomong@wvdhhr.org>
08/31/2006 02:16 PM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc Charlotte Billingsley <charlottebillingsley@wvdhhr.org>
Subject Requested Documents

Joe,

Attached are the SOP's that we are using for drinking water. They include: Colilert, Multi Tube Fermentation and Colilert. There is a separate SOP for Colilert Quanti Tray that details E. coli monitoring under LT2 but it isn't quite ready to send. Should be ready by mid next week.

The SOP for Certification is about 5 years old and is being updated. It should be complete by the time of the on-site. Actually, all of the procedures are being updated and converted to MS Word.

The Micro Quality Systems Manual should be combined with chemistry's.

Thomas L. Ong, Microbiologist Supervisor
Chief - Laboratory Certification Officer
Chief - Laboratory Evaluation Officer
WVDHHR - BPH
Office of Laboratory Services
167 - 11th Avenue
South Charleston, WV 25303
Phone: 304-558-3530, Ext. 2710
email: tomong@wvdhhr.org

Chapter XX - Drinking Water Certi fication Rev. 8-23-01.wpd

ChromoFluoro100 10-16-00.wpd

Membrane Filter 100 mL.wpd

MTF100 CH 6-16-00.wpd

Joe
Slayton/ESC/R3/USEPA/US
08/30/2006 07:22 PM

To Larry Duffield <larryduffield@wvdhhr.or>
cc George Long/ESC/R3/USEPA/US@EPA
bcc
Subject Fw: PreSurvey

LarryD: George Long and I have been working our way thru the material you sent and we have noticed several missing items:--please fill in status of each below. Thanks.

1). No CN IDC and MDL studies (MDL provided is 12/05 by an analyst no longer at the lab);

2). F- only MDL is 2/05 by an analyst no longer at the lab);

3). No MDL study for Nitrate via 353.2;

4). No MDL & IDC for Nitrate via 300.0 (only studies are by an analyst no longer at the lab);

5). No MDL & IDC for Nitrite via 300.0 (only studies are by an analyst no longer at the lab);

6). No MDL study for Chloride via 300.0;

7). No MDL study for sulfate via 300.0;

8). No MDL study for Ca/Ca Hardness;

9). No IDC and MDL studies for turbidity.

---- Forwarded by Joe Slayton/ESC/R3/USEPA/US on 08/30/2006 07:10 PM ----

Joe
Slayton/ESC/R3/USEPA/US
08/11/2006 07:57 AM

To Larry Duffield <larryduffield@wvdhhr.org>
cc
Subject Re: PreSurvey

I have always enjoyed working with your folks in WV. Tom is a very nice guy. Sorry to hear of his loss.
Joe
Larry Duffield <larryduffield@wvdhhr.org>

Larry Duffield
<larryduffield@wvdhhr.org>
08/11/2006 07:48 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc
Subject Re: PreSurvey

Joe,

I shall inquire on my own next week, although you copied this to all

the right people. I believe Charlotte Billingsley has informed you of the unfortunate tragedy that befell Tom Ong Last weekend with the sudden and tragic passing of his wife. I doubt he will be back to work for a week or two. I am sure he has the form saved in a file, but he's probably the only one with access to it.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

>>> <Slayton.Joe@epamail.epa.gov> 8/10/2006 5:45:55 PM >>>
Almost forgot...any chance of getting a copy of the micro-presurvey (which includes the microchecklist) as an electronic file?

Larry Duffield <larryduffield@wvdhhr.org> 08/10/2006 10:15 AM	To	Joe Slayton/ESC/R3/USEPA/US@EPA
	cc	George Long/ESC/R3/USEPA/US@EPA, Andrea Labik <andrealabik@wvdhhr.org>, Charlotte Billingsley <charlottebillingsley@wvdhhr.org>, Tom Ong <tomong@wvdhhr.org>
	Subject	PreSurvey

Joe,

Yesterday, we mailed to you a box containing the documents, data, info,
etc. that you requested for the PreSurvey evaluation. Included is a disc that contains our QA Manual, Certification SOP, and Chemistry method SOPs. The QA Manual is for both the Chemistry and Micro sections. Two of the metals SOPs that you will see are incomplete or obsolete and should be disregarded. The SOPs in use have signed signature pages, copies of which I have sent you. I also included a copy of the Chemistry Presurvey form and Tom Ong's Micro PreSurvey form.
I thought you might like an electronic copy of the Chem PreSurvey so I
attached it.
We mailed the materials Certified/Priority, so you should get it by Monday.
If there is anything missing, deficient, or puzzling, please let me know immediately and we'll deal with it.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

(See attached file: Attach 3 Presurvey 6-20-06.rtf)

STATE OF WEST VIRGINIA
DEPARTMENT OF HEALTH AND HUMAN RESOURCES

Joe Manchin III
Governor

ENVIRONMENTAL CHEMISTRY

Martha Yeager Walker
Secretary

November 20, 2006

Joseph Slayton
Technical Director
United States Environmental Protection Agency
Environmental Science Center
Analytical Services and Quality Assurance Branch
701 Mapes Road
Fort Meade, MD 20755-5350

Dear Mr. Slayton,

This letter is to serve as our Corrective Action Plan in response to the deviations (findings) that were documented in the Final On-Site Laboratory Evaluation Report (SDWA) for Inorganic Chemistry dated 10-24-06. The response will follow a restatement of the Analytical Deviations from section I. of the report:

Metals:

1. The digestion matrix used for 200.7 samples (1% nitric/0.5% HCl) does not match the method. The digestion procedure will need to be adjusted to meet the method requirement of 2% nitric/1%HCl. (200.7, 11.2.3)

Response: The SOP for method 200.7 has been revised to meet the digestion matrix requirement of 2% HNO3 + 1% HCl.

2. Once the new mercury instrument is on-line and validated, a determination of certification will be made based on submittal of the SOP, IDC, MDL, and PT information.

Response: The SOP, IDC, and an MDL study have already been submitted to your office. The MDL that was initially derived now seems to be unrealistically low (0.007 ppb). Robin Costas has since given us advice on how to develop a usable MDL which we have employed and a copy of this most current study is attached (new MDL=0.02 ppb). We are now enrolled in a PT for mercury, ERA's WS-124, which has a closing date of December 21.

3. Thallium by 200.9 cannot be certified at this time. The current instrumentation (PE 5100) is not capable of producing acceptable data. This situation will have to be

resolved before certification can be considered.

Response: We have decided that it is not prudent to try to have the PE 5100 repaired due to its age and lack of ability to reliably quantify below the MCL for Thallium. We have submitted to our Administration a request for a Laboratory Improvement Package in which is expressed our need for an ICP-MS which would enable us to not only regain certification for Thallium but would also allow us to replace other slow, antiquated instruments and methods.

Inorganic Non-metals:

1. The laboratory reporting sheets (results provided to customers), include a listing of laboratory MDLs. This needs to be updated to reflect current performance studies. (GLP, CLADW Section IV, 8.1)

Response: We have updated our MDL listing on our customer report forms to reflect the values of the latest studies. Please see attached a copy of this form.

2. The TDS bench sheets need to be updated to include the volume of sample. (GLP, CLADW Section IV, 8.1)

Response: The TDS bench sheets have been updated to include the volume of sample. Please see attached a copy of this form.

3. To complete the records for pH results, the lot numbers for the pH buffers need to be recorded and the certificates for pH reference buffers need to be on file (traceability). (GLP, CLADW Section IV, 8.1)

Response: The worksheets for pH have been reformatted to include the lot numbers for each buffer. Please see the attached copy of this form. The certificates for the pH buffers will be filed for easy access with a note in the SOP stating this will be done.

4. The analytical records for alkalinity (H2SO4) and hardness (EDTA) need to include the certificates for the titrant since this material is purchased as "certified". (GLP, CLADW Section IV, 8.1)

Response: Copies of these certificates will be filed in the alkalinity and hardness workbooks. Please see attached copies of these certificates.

5. To complete the analytical records for TDS, the serial number for the reference weights used to verify analytical balance accuracy must be recorded. (GLP, CLADW Section IV, 8.1)

Response: The worksheet for TDS has been reformatted to include the serial number for the reference weights. See attached copy.

6. The thermometer calibration records were found to be incomplete. All thermometer calibrations with document that lacks serial numbers of the reference thermometers need to be repeated. (GLP, CLADW Section IV, 7.1.5 and 8.1)

Response: The thermometer calibration recording sheets have been modified to include serial numbers and all calibrations have been repeated. See attached copy of the forms.

7. Once the new turbidity instrument is on-line and validated, a determination of certification will be made based on submittal of the SOP, IDC, MDL, and PT information.

Response: SOP and qualifying data will be submitted by February 2007.

8. Ion Chromatography supporting data needs to include a hardcopy of the chromatographs. (Laboratory's 2006 QA Manual, appendix K, p.88-89 and CLADW Section IV, 8.1)

Response: The report format has been selected from the software which includes chromatographs. See attached copy of a representative report.

We hope that these corrections meet with your approval.

Yours truly,

Larry A. Duffield
Program Manager I
Environmental Chemistry Laboratory

cc: Dr. Labik
Charlotte Billingsley

BUREAU FOR PUBLIC HEALTH
OFFICE OF LABORATORY SERVICES, ENVIRONMENTAL CHEMISTRY LAB
4710 Chimney Drive, Suite G, Charleston, WV 25302
Phone: 304-965-2694 FAX: 304-965-2696

STATE OF WEST VIRGINIA
DEPARTMENT OF HEALTH AND HUMAN RESOURCES

Joe Manchin III
Governor

ENVIRONMENTAL CHEMISTRY

Martha Yeager Walker
Secretary

November 20, 2006

Joseph Slayton
Technical Director
United States Environmental Protection Agency
Environmental Science Center
Analytical Services and Quality Assurance Branch
701 Mapes Road
Fort Meade, MD 20755-5350

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Yours truly,

_____

Larry A. Duffield
Program Manager I
Environmental Chemistry Laboratory

cc: Dr. Labik
Charlotte Billingsley

BUREAU FOR PUBLIC HEALTH
OFFICE OF LABORATORY SERVICES, ENVIRONMENTAL CHEMISTRY LAB
4710 Chimney Drive, Suite G, Charleston, WV 25302
Phone: 304-965-2694 FAX: 304-965-2696

STATE OF WEST VIRGINIA
DEPARTMENT OF HEALTH AND HUMAN RESOURCES

Joe Manchin III
Governor

ENVIRONMENTAL CHEMISTRY

Martha Yeager Walker
Secretary

July 18, 2006

Charles Jones, Jr.
EPA Region III
1650 Arch Street
Philadelphia, PA 19103

CORRECTIVE ACTION REPORT
Proficiency Testing Study WS-118

Study WS-118
Exception Report

This exception report shows only those analytes with a performance evaluation of not acceptable.

Standard/Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Report Type With Not Acceptable Evaluation	Method Description
Method Number: 1						
Turbidity						
Turbidity	NTU	1.54	2.02	1.73 - 2.54	**Not Acceptable**	EPA 180.1

Turbidity by EPA 180.1: The Drinking Water Proficiency Testing results (ERA WS-118) for turbidity (1.54NTU) was outside the acceptable limits of the study (1.73 – 2.54NTU). After reviewing several documents on the HACH website, some possible reasons for the low turbidity results and how to correct them can be tried.

Some avenues to consider, is a longer warm-up-time for the lamp. The operational temperature of the tungsten lamp is 2200-3000°K. At this temperature, the lamp emits the proper wavelength of 400 to 600nm. Currently the lamp is given 30 minutes to warm up.

Any measurement below 1.0 NTU is significantly effected by stray light and particle contamination of the solutions. Stray light can come from many sources: sample cell with scratched or imperfect surfaces, reflection within the sample cell compartment, reflections within the optics system, lamps the emit diverging light, and to a small extent, electronics. Another source of stray light is dust within the instrument. Currently the

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OFFICE OF LABORATORY SERVICES, ENVIRONMENTAL CHEMISTRY LAB
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instrument is calibrated at 0.2 to 1.0 NTU. Because ultra-low turbidity readings are susceptible to bias readings due to stray light at these levels, the current calibration standards may not be appropriate to calibrate the instrument. A new calibration curve will be developed consisting of a blank, 0.5, 10.0, 20.0, and 40.0 NTU. This is within the linear range of the instrument and should not be affected significantly by stray light if present.

To determine the extent of stray light present in the instrument a formazin solution of known ultra low turbidity concentration (<1.0 NTU) will be prepared. This solution is then spiked repeated and through the methods of standards addition, the theoretical concentration of the starting solution can be calculated and compared to its true value. The difference between the prepared value and the theoretical value is the amount of bias due to stray light.

Corrective Action: New AMCO Clear Turbidity Standards (10, 20, and 40 NTU) have been ordered and if the recoveries of the Resource Technology Corporation (RTC) quality control Turbidity sample are within the acceptable limits, then a Proficiency Testing Water Study will be ordered promptly.

_____

Larry A. Duffield
Program Manager I
Quality Assurance Officer
Chief Certification Officer

WV – qualifying data

From: Joe Slayton/ESC/R3/USEPA/US
To: Dave Russell/ESC/R3/USEPA/US
cc: WandaF Johnson/R3/USEPA/US@EPA, Rick Rogers/R3/USEPA/US@EPA

corrective 2006 CActions

Date: Saturday, February 17, 2007 08:32PM
Subject: Re: WV Corrective actions

Issue: Recommendation #1 Microbiology.

WandaJ: would you be available PM on Wed 2/21/07 or AM on Thursday 2/22/07. Please invite others who might be expert at the SDWA data--data base. Thanks, JoeS.
-----Dave Russell/ESC/R3/USEPA/US wrote: -----

To: WandaF Johnson/R3/USEPA/US@EPA
From: Dave Russell/ESC/R3/USEPA/US
Date: 02/06/2007 10:23AM
cc: Joe Slayton/ESC/R3/USEPA/US@EPA, Rick Rogers/R3/USEPA/US@EPA
Subject: Re: WV Corrective actions

Wanda and Joe,

I'd like to get back to this WV issue to see where things stand and what we can do. How about a conference call on one of these dates?

we had a teleconference on 2/21/07 with Dave R George L Joe S Wanda Johnson X3249 & Dan Campanelli X5449

Wed. 7th PM only

Thursday, 8th at 2:00 or later

Tuesday, 13th AM only

Wednesday, 14th PM only

Wanda, Joe and I can call you from Joe's office here.
Let me know re availability.

Dave

WandaF Johnson/R3/USEPA/US

WandaF Johnson/R3/USEPA/US
11/29/2006 09:19 AM

To Dave Russell/ESC/R3/USEPA/US@EPA
cc Joe Slayton/ESC/R3/USEPA/US@EPA, Rick Rogers/R3/USEPA/US@EPA
Subject Re: WV Corrective actions

Dave/Joe: a conference call would be fine to discuss this issue. Tomorrow and Fri. are good for me, anytime. From what I've read a quick fix would be to rely solely on the hard copy report and related forms until the database can be updated/revised. Meanwhile, I will discuss the need for database revisions further with WV EED.

W- Outcome: Wanda to contact WV Program Manager Walt Ivy to make sure BAS data not included in WV data base. Staff will keep OAQDA posted.

(215) 814-3249

Dave Russell/ESC/R3/USEPA/US

Dave Russell/ESC/R3/USEPA/US

11/27/2006 11:29 AM

ToWandaF Johnson/R3/USEPA/US@EPA
ccRick Rogers/R3/USEPA/US@EPA, Joe Slayton/ESC/R3/USEPA/US@EPA
SubjectRe: WV Corrective actions

Wanda,

Recommendation #1 in the report attached below summarizes the problem. The lab's microbiologists feel the issue is out of their hands and that they have no way to make a change. The database (designed by a contractor) was more or less imposed on them by the Environmental Engineering Section. Nonetheless, data reporting is within the scope of the Microbiology SDWA audit and the lab does have some responsibility here. They want to do the right thing, but have no control, or ability to make a change in the database design. Consequently, the Environmental Engineering Section needs to be involved.

Several years back we made great strides forward gaining the Labs cooperation in flagging data, when appropriate, "Not valid for SDWA compliance reporting" -- Rick's exact words as I recall. The Lab has even included the language on it's paper report. But , now, due to the odd double reporting system that has evolved, we've lost some ground.

Would very much appreciate your assistance in correcting the situation.

Dave Russell
SDWA Microbiology CO
EPA Region 3

Joe Slayton/ESC/R3/USEPA/US

Joe Slayton/ESC/R3/USEPA/US

11/27/2006 09:26 AM

ToDave Russell/ESC/R3/USEPA/US@EPA
ccWandaF Johnson/R3/USEPA/US@EPA, Rick Rogers/R3/USEPA/US@EPA
SubjectRe: WV Corrective actions

WandaJ can you weigh in on recommendation #1...perhaps a phone conversation with Dave and I? Thanks, JoeS

Dave Russell/ESC/R3/USEPA/US

Dave

ToJoe

Russell/ESC/R3/USEPA/US Slayton/ESC/R3/USEPA/US@EPA
cc
11/27/2006 09:13 AM SubjectRe: WV Corrective actions

No, there were no general findings -- since we moved the issue of the double reporting of results (one w/ flagging, the other without, the latter being the one used) to the engineers to Recommendations with the idea that Wanda Johnson would address this issue. In retrospect, the issue probably should have been a finding--which is where I had it originally (at the de-briefing).

Joe Slayton/ESC/R3/USEPA/US

Joe Slayton/ESC/R3/USEPA/US

11/22/2006 02:38 PM

ToRobin Costas/ESC/R3/USEPA/US@EPA, Dave Russell/ESC/R3/USEPA/US@EPA
ccGeorge Long/ESC/R3/USEPA/US@EPA
SubjectWV Corrective actions

Chemistry...scanned for Ms. Robin

DaveR--can't recall did they owe you any cor. actions?

Attachments:

WVmicro06.doc WV CAplan 2006.pdf

From: Dave Russell/ESC/R3/USEPA/US
To: Joe Slayton/ESC/R3/USEPA/US@EPA

Date: Friday, February 16, 2007 01:55PM
Subject: Re: WV Corrective actions

Joe,

These work for me:

Wed 21 PM
Thurs 22 AM only
Fri 23 AM or PM

Dave

Joe Slayton/ESC/R3/USEPA/US

Joe Slayton/ESC/R3/USEPA/US

02/15/2007 08:03 PM

ToDave Russell/ESC/R3/USEPA/US@EPA
cc
SubjectRe: WV Corrective actions

Sorry DaveR been slow ...what about PM on Wed. 21 or AM on Thursday 22 or AM or PM on Friday 23? I will forward your response to WandaJ/RickR et al.

Dave Russell/ESC/R3/USEPA/US

Dave Russell/ESC/R3/USEPA/US

02/06/2007 10:23 AM

ToWandaF Johnson/R3/USEPA/US@EPA
ccJoe Slayton/ESC/R3/USEPA/US@EPA, Rick Rogers/R3/USEPA/US@EPA
SubjectRe: WV Corrective actions

Wanda and Joe,

I'd like to get back to this WV issue to see where things stand and what we can do. How about a conference call on one of these dates?

Wed. 7th PM only

Thursday, 8th at 2:00 or later

Tuesday, 13th AM only

Wednesday, 14th PM only

Wanda, Joe and I can call you from Joe's office here.
Let me know re availability.

Dave

WandaF Johnson/R3/USEPA/US

WandaF Johnson/R3/USEPA/US

11/29/2006 09:19 AM

To Dave Russell/ESC/R3/USEPA/US@EPA
cc Joe Slayton/ESC/R3/USEPA/US@EPA, Rick Rogers/R3/USEPA/US@EPA
Subject Re: WV Corrective actions

Dave/Joe: a conference call would be fine to discuss this issue. Tomorrow and Fri. are good for me, anytime. From what I've read a quick fix would be to rely solely on the hard copy report and related forms until the database can be updated/revised. Meanwhile, I will discuss the need for database revisions further with WV EED.

W-
(215) 814-3249

Dave Russell/ESC/R3/USEPA/US

Dave Russell/ESC/R3/USEPA/US

11/27/2006 11:29 AM

To WandaF Johnson/R3/USEPA/US@EPA
cc Rick Rogers/R3/USEPA/US@EPA, Joe Slayton/ESC/R3/USEPA/US@EPA
Subject Re: WV Corrective actions

Wanda,

Recommendation #1 in the report attached below summarizes the problem. The lab's microbiologists feel the issue is out of their hands and that they have no way to make a change. The database (designed by a contractor) was more or less imposed on them by the Environmental Engineering Section. Nonetheless, data reporting is within the scope of the Microbiology SDWA audit and the lab does have some responsibility here. They want to do the right thing, but have no control, or ability to make a change in the database design. Consequently, the Environmental Engineering Section needs to be involved.

Several years back we made great strides forward gaining the Labs cooperation in flagging data, when appropriate, "Not valid for SDWA compliance reporting" -- Rick's exact words as I recall. The Lab has even included the language on it's paper report. But , now, due to the odd double reporting system that has evolved, we've lost some ground.

Would very much appreciate your assistance in correcting the situation.

Dave Russell
SDWA Microbiology CO
EPA Region 3

Joe Slayton/ESC/R3/USEPA/US

Joe Slayton/ESC/R3/USEPA/US

11/27/2006 09:26 AM

To Dave Russell/ESC/R3/USEPA/US@EPA
cc WandaF Johnson/R3/USEPA/US@EPA, Rick Rogers/R3/USEPA/US@EPA
Subject Re: WV Corrective actions

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Dave Russell/ESC/R3/USEPA/US

Dave Russell/ESC/R3/USEPA/US

11/27/2006 09:13 AM

To Joe Slayton/ESC/R3/USEPA/US@EPA
cc
Subject Re: WV Corrective actions

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Joe Slayton/ESC/R3/USEPA/US

Joe Slayton/ESC/R3/USEPA/US

11/22/2006 02:38 PM

To Robin Costas/ESC/R3/USEPA/US@EPA, Dave Russell/ESC/R3/USEPA/US@EPA
cc George Long/ESC/R3/USEPA/US@EPA
Subject WV Corrective actions

Chemistry...scanned for Ms. Robin

DaveR--can't recall did they owe you any cor. actions?

Attachments:

WVmicro06.doc

WV CAplan 2006.pdf

ENVIRONMENTAL
RESOURCE ASSOCIATES®
The Industry Standard™

September 26, 2006

Joe Slayton
US EPA Region III
ASQAB
701 Mapes Road
Fort Meade, MD 20755-5350

Dear Joe,

On September 12, 2006, West Virginia Department of Health Environmental Chemistry Lab located in Charleston, West Virginia, participated in ERA's QuiK™ Response Performance Evaluation Program. The following result was reported to ERA by West Virginia Department of Health Environmental Chemistry Lab for the PE standard, Project Number 091206F. The Certified Value and the QuiK™ Response Acceptance Limits were not available to West Virginia Department of Health Environmental Chemistry Lab. This report will be released to West Virginia Department of Health Environmental Chemistry Lab.

If you have any questions, please contact either myself, or Shawn Kassner, Proficiency Testing Program Manager, at 1-800-372-0122.

Sincerely,

Steve Bueghly
Proficiency Testing Chemist

Cc: Project File Number 091206F

ENVIRONMENTAL RESOURCE ASSOCIATES®
The Industry Standard™

QuiK™ Response Final Report
Project Number: 091206F

West Virginia Department of Health
Environmental Chemistry Lab
4710 Chimney Drive, Suite G
Charleston, West Virginia 25302

Results reported by: Larry Duffield
Title: Program Manager I
Phone # 304-965-2694
Fax # 304-965-2696

ERA Laboratory Code: W2134-01
EPA Lab ID: WV00003

Study Open Date: 9/12/2006
Study Close Date: 9/25/2006
Report Issue Date: 9/26/2006

WatR™ Supply Turbidity (cat# 699QR)

Analyte No.	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description
0023	Turbidity	NTU	7.04	6.46	5.70 - 7.61	Acceptable	EPA 180.1

INITIAL DEMONSTRATION OF CAPABILITY

For Precision and Accuracy

Data Summary

COPY

Study Number MM-1

Method 180.1 Analyte TURBIDITY

SOP Number/Revision REVISION 2 Date Completed 12-6-06

Instrument Name and Model Number HACH 2100N TURBIDIMETER

Instrument Software (version) KYOSHA C029.K5

Reason for Study NEW EMPLOYEE

Source of Calibration Standard (Name / Lot #) W075 APHA/LOT #611731

Quality Control Sample (Name / Lot #) EPA WS-34

True Value 0.720NTU

Data QC Sample was Made 12-6-06

Date of Analysis 12-6-06

put in corrective action file

Replicate	Concentration (NTU)	Percent Recovery
#1	0.862	120
#2	0.857	110
#3	0.859	119
#4	0.837	116

Mean Recovery 116 Accuracy Limit 62 -155% Source of Limit WS034

% RSD 4.03 Precision Limit <5% RSD Source of Limit SOP

Martha A McElrath 12.6.06
Analyst / Date

12-7-06

Revision Date 09/21/06

TURBIDITY

EPA METHOD 180.1

INITIAL DEMONSTRATION OF CAPABILITY

Lot/Tracking Numbers		Calibration Standards	NTU		Percent Recovery
		0.0 NTU	0.052		
		20 NTU	20.0		
W075		200 NTU	200.0		
		1000 NTU	1000.0		
		4000 NTU	4000.0		
Lot/Tracking Numbers		Samples	Conductivity in uS/cm	Reported Value	Percent Recovery
W075		CVS-0.50 NTU	0.552		110
W075		CVS-10 NTU	10.1		101
W075		CVS-20 NTU	20.3		102
W075		CVS-30 NTU	29.7		99
W075		CVS-40 NTU	39.2		98
		QC Blank	0.034	0.034	
W075		LFB	19.9		100
		LRB	0.034	0.068	
WS034		IDC-1	0.862	0.862*	120
WS034		IDC-2	0.857	0.857*	110
WS034		IDC-3	0.859	0.859*	119
WS034		IDC-4	0.837	0.837*	116
ERA CAT.#699QR		UNKNKOWN	6.86	6.860	106
ERA CAT.#699QR		UNKNKOWN	6.9	6.900	107
ERA CAT.#699QR		UNKNKOWN SPIKE	17.1	17.100	102
ERA CAT.#699QR		UNKNKOWN SPIKE DUPLICATE	17.2	17.200	103
		Check Standard	20.5	20.50	103
		QC Blank	0.036	0.04	
		Std. Deviation:	4.6809		
		Mean:	116.22		
		RSD:	4.03		
*IDC Acceptance Range: 0.446-1.12 NTU from WS034 Study					

C:\Documents and Settings\ms249b\Desktop\2006 MDL STUDIES\Martha\TURBIDITY MDL2006

HACH 2100N P 1.2
HACH 2100N P 1.2

Turbidity Method 180.1

CALIBRATION DATA 12-6-06 1:30 PM MM
UNITS: NTU
STANDARDS:
00 0.0523
01 20.000
02 200.00
03 1000.0
04 4000.0
COEFFICIENTS:
A0=566.47200
B0=0.0020624
B1=0.0006938
C0=0.0020310
C1=0.0008246
C2=-0.000190

IDC & Unknown Analysis

~~0.560 NTU~~ Not stable

0.552 NTU TV- 0.50

10.1 NTU - TV-10

20.3 NTU - TV-20

29.7 NTU - TV-30

~~38.8 NTU~~
39.2 NTU - TV-40

19.9 NTU LFB

0.034 NTU LRB

0.862 NTU IDC-1 TV- ~~0.781~~ 0.720 MM

~~0.904 NTU~~ Not Stable

0.857 NTU IDC-2 TV- ~~0.781~~ 0.720 MM

0.~~807~~ NTU Not stable

0.859 NTU IDC-3 TV · ~~0.781~~ 0.720 MM

0.837 NTU IDC-4 TV · ~~0.781~~ 0.720 MM

6.86 NTU Unknown T.V = 6.46

6.90 NTU Unknown Dup

17.1 NTU Unknown Spike
Spiked at 10 NTU

17.2 NTU Unknown Spike Dup
Spiked at 10 NTU

20.5 NTU Chk. Std

0.036 NTU QC Blank

Participant ID: Type: Requesting Office:

Sample Number	Reported Value	True Value*	Acceptance Limits	Performance Evaluation
INORGANIC DISINFECTION BY-PRODUCTS IN MICROGRAMS PER LITER:				
193-BROMATE				
01	.	7.52	D.L. - 33.8	
194-CHLORATE				
01	.	70.0	54.2- 86.6	
195-CHLORITE				
01	.	260	180- 405	
MISCELLANEOUS ANALYTES:				
022-RESIDUAL FREE CHLORINE(MILLIGRAMS PER LITER)				
01	.	1.60	1.23- 1.73	
023-TURBIDITY(NTU'S)				
01	.	0.720	0.446- 1.12	
024-TOTAL FILTERABLE RESIDUE(MILLIGRAMS PER LITER)				
01	.	319	216- 536	
025-CALCIUM(MG. CACO3/L)				
01	.	180	169- 193	
026-PH-UNITS				
01	.	9.12	8.86- 9.27	
027-ALKALINITY(MG. CACO3/L)				
01	.	33.0	30.7- 37.2	
028-CORROSIVITY(LANGELIER IND. AT 20C)				
01	.	0.943	0.611- 1.23	
029-SODIUM(MILLIGRAMS PER LITER)				
01	.	15.2	13.7- 16.6	
144-CORROSIVITY(AGGRESSIVE IND. AT 20C)				
01	.	12.9	12.5- 13.2	
145-SULFATE(MILLIGRAMS PER LITER)				
01	.	400	364- 435	
146-TOTAL CYANIDE(MILLIGRAMS PER LITER)				
01	.	0.140	0.105-0.175	
251-ETHYLENE THIOUREA (ETU)				
01	.	32.4	10.4- 56.4	
252-DIOXIN(IN PG/L)				
01	.	26.0	18.3- 32.4	

WS034 Source of IDC 4 replicates for Precision + Accuracy RW

********** END OF DATA FOR **********
NOTE: FOR LIMITS AND TRUE VALUES, ASSUME THREE SIGNIFICANT DIGITS.
********** END OF REPORT FOR **********

* Based on theoretical calculations, or a reference value when necessary.

ONMENTAL
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e Industry Standard™

QuiK™ Response Final Report
Project Number: 091206F

West Virginia Department of Health
Environmental Chemistry Lab
4710 Chimney Drive, Suite G.
Charleston, West Virginia 25302

ERA Laboratory Code: W2134-01
EPA Lab ID: WV00003

Results reported by: Larry Duffield
Title: Program Manager I
Phone # 304-965-2694
Fax # 304-965-2696

Study Open Date: 9/12/2006
Study Close Date: 9/25/2006
Report Issue Date: 9/26/2006

WatR™ Supply Turbidity (cat# 699QR)

Analyte No.	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description
0023	Turbidity	NTU	7.04	6.46	5.70 - 7.61	Acceptable	EPA 180.1

(#699QR
Source of
IDC Unknown)

(4)

Certificate of Analysis

EMD Chemicals Inc.
480 S. Democrat Road
Gibbstown, NJ 08027
Phone 856-423-6300
Fax 856-423-4389

Rec 8/29/06
W060

Name: Sulfuric Acid Solution
Sulfuric Acid 0.020N (VWR Brand)

Formula: H_2SO_4 in water

Item Number: VW3229, VW3229-7, VW3229-1

Formula Wt: 98.08

Lot Number: 6114

Data Order No: 000153221

CHARACTERISTIC	REQUIREMENT		RESULTS	UNITS
	Min.	Max.		
#Expiration date			30-APR-2007	
Appearance			Passes test	
Color (APHA)		10	<10	AU
Concentration (normality)	0.0199	0.0201	0.0200	N
SRM Tris(Hydroxymethyl)Aminomethane			723d	

Jim Morgera,
Quality Control Manager

Release Date: 4/17/2006

EMD Chemicals Inc.
(Formerly EM Science, A Division of EM Industries, Inc.)
An Affiliate of Merck KGaA, Darmstadt, Germany

(4)

Certificate of Analysis

EMD Chemicals Inc.
480 S. Democrat Road
Gibbstown, NJ 08027
Phone 856-423-6300
Fax 856-423-4389

Rec 8/29/06
W061

Name: Water Hardness Titrant Solution
Water Hardness Titrant w/o Mg

Formula:

Item Number: VW3511, VW3511-4, VW3511-1

Formula Wt:

Lot Number: 6072

Data Order No: 000152324

CHARACTERISTIC	REQUIREMENT		RESULTS	UNITS
	Min.	Max.		
Concentration	0.99	1.01	0.998	mg/mL
Expiration date			31-AUG-2007	
SRM Calcium Carbonate			915a	

Jim Morgera,
Quality Control Manager

Release Date: 3/10/2006

EMD Chemicals Inc.
(Formerly EM Science, A Division of EM Industries, Inc.)
An Affiliate of Merck KGaA, Darmstadt, Germany

ENVIRONMENTAL
RESOURCE ASSOCIATES®
The Industry Standard™

September 26, 2006

Joe Slayton
US EPA Region III
ASQAB
701 Mapes Road
Fort Meade, MD 20755-5350

Dear Joe,

On September 12, 2006, West Virginia Department of Health Environmental Chemistry Lab located in Charleston, West Virginia, participated in ERA's QuiK™ Response Performance Evaluation Program. The following result was reported to ERA by West Virginia Department of Health Environmental Chemistry Lab for the PE standard, Project Number 091206F. The Certified Value and the QuiK™ Response Acceptance Limits were not available to West Virginia Department of Health Environmental Chemistry Lab. This report will be released to West Virginia Department of Health Environmental Chemistry Lab.

If you have any questions, please contact either myself, or Shawn Kassner, Proficiency Testing Program Manager, at 1-800-372-0122.

Sincerely,

Steve Bueghly
Proficiency Testing Chemist

Cc: Project File Number 091206F

ENVIRONMENTAL RESOURCE ASSOCIATES®
The Industry Standard™

QuiK™ Response Final Report
Project Number: 091206F

West Virginia Department of Health
Environmental Chemistry Lab
4710 Chimney Drive, Suite G
Charleston, West Virginia 25302

ERA Laboratory Code: W2134-01
EPA Lab ID: WV00003

Results reported by: Larry Duffield
Title: Program Manager I
Phone # 304-965-2694
Fax # 304-965-2696

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Analyte No.	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description
0023	Turbidity	NTU	7.04	6.46	5.70 - 7.61	Acceptable	EPA 180.1

THERMOMETER CALIBRATION VERIFICATION SHEET

Manual for the Certification of Laboratories Analyzing Drinking Water (CLADW), 5th Edition, Chapter IV, Section 7.1.5. – Liquid bearing thermometers need to be verified at least annually and with a NIST traceable thermometer. Digital Thermometers should be calibrated at least quarterly. Calibration verification should be done at the working temperature of the thermometer based up the method needs.

If a thermometer differs by more than 1°C from the reference thermometer, it should be discarded. (CLADW, Chapter V, Section 3.3.3)

Date	Analyst	Serial Number of Laboratory Thermometer	Serial Number of NIST Traceable Thermometer	Temperature of Laboratory Thermometer	Temperature of NIST Traceable Thermometer	Correction Factor	Comments
9/27/06	GY	51228690	0280523	2.8°C	3.0°C	+0.2 °C	wet chem Lab
		51228683		3.9°C	3.4°C	-0.5°C	
		51228743		2.8°C	3.2°C	+0.4°C	
		51228671		1.8°C	2.2°C	+0.4°C	
		C01C-5	3N1726	180°C	180.1°C	0.0	
		3500	5749223	95°C	95.2°C	0.0	
		61013-028	0280523	23°C	23°C	0.0	
		61659235	0280523	3.5	3.4	-0.1	wet chem Lab

Page Number _____

(8)

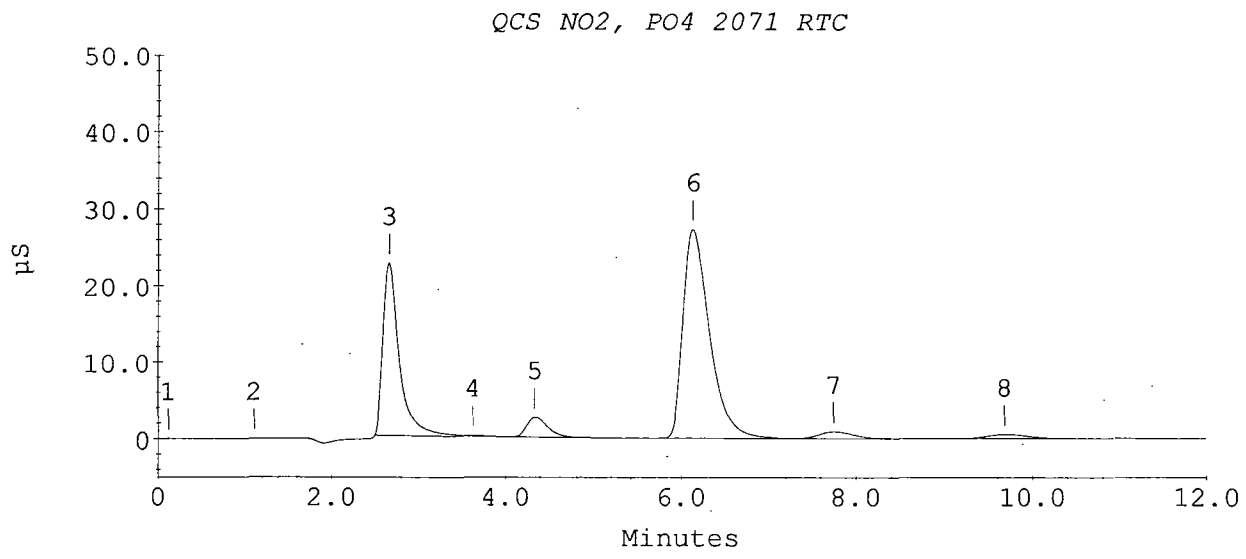
Sample Analysis Report

Sample Name : QCS NO2, PO4 2071 RTC
Data File Name : C:\PEAKNET\DATA\YEAR 2006\OCTOBER\DY26_012.DXD

Method File Name : c:\peaknet\method\as14a_method_ f_cl_so4_no3_no2_po4.met
Date Time Collected : 10/26/06 12:33:07 PM
System Operator : Martha McElfresh

Peak Information : All Peaks

Peak #	Component Name	Retention Time	Peak Area		Amount
1		0.12	830		0.00
2		1.11	441		0.00
3	FLUORIDE	2.67	2890686		7.11
4	CHLORIDE	3.63	21754		23.83
5	NITRITE	4.34	422378	T.V. .683	0.64
6	NITRATE	6.13	5823956		7.32
7	PHOSPHATE	7.75	247265	.967	0.92
8	SULFATE	9.68	170949		24.29



COPY

Method Detection Limit
Data Summary

Method 245.1 Analyte Hg

Analyst Pat Marchio Intsrument Cetac M6100

True Value of Fortified Reagent Water (FRW) used 0.20 ppb

Date.....	Mean of 7 replicates	Standard Deviation	%RSD	MDL
11/17/06	0.12277	0.00643	5.24	0.020 ppb

MDL = Standard Deviation X Student t Value (3.14)

MDL = 0.00643 X 3.14 = 0.0202

MDL = 0.020 ppb

Reviewed by 11-20-06

CETAC Hg Analysis Report

Analyst: Pat Marchio pm

Worksheet file: C:\Program Files\QuickTrace\Worksheets\111706c.wsz

Date Started: 11/17/2006 1:26:37 PM

Comment:

Results

Sample Name					Type	Date/Time	Conc (ppb)	µAbs	%RSD	Flags
Calibration Blank					STD	11/17/06 01:34:21 pm	0.000000	299	6.61	
Replicates	314.4	300.6	309.7	270.4						
0.2 ppb					STD	11/17/06 01:37:06 pm	0.200000	2277	1.08	
Replicates	2280.6	2301.9	2282.6	2243.2						
0.5 ppb					STD	11/17/06 01:39:53 pm	0.500000	5722	1.07	
Replicates	5638.7	5727.4	5733.8	5786.6						
1.0 ppb					STD	11/17/06 01:42:40 pm	1.000000	10788	1.27	
Replicates	10584.2	10871.0	10858.3	10839.3						
2.0 ppb					STD	11/17/06 01:45:27 pm	2.000000	21622	0.79	
Replicates	21375.1	21763.1	21680.9	21669.8						
5.0 ppb					STD	11/17/06 01:48:15 pm	5.000000	53614	1.33	
Replicates	52796.7	53312.9	53902.1	54442.9						
10.0 ppb					STD	11/17/06 01:51:54 pm	10.000000	100734	1.52	
Replicates	102419.8	101625.0	99660.3	99230.5						

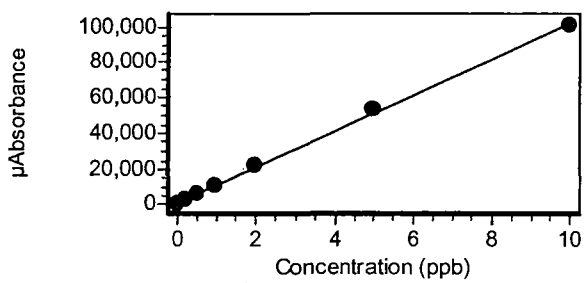
Calibration

Equation: A = 873.555 + 10103.770C

R2: 0.99910 ✓

SEE: 1216.6720

Flags:



ICV 5.0 ppb					ICV	11/17/06 01:55:32 pm	5.192000	53337	1.69	
Replicates	52128.1	53172.9	54096.4	53948.9						
% Recovery	103.85 ✓									

Sample Name					Type	Date/Time	Conc (ppb)	µAbs	%RSD	Flags
ICB					ICB	11/17/06 01:59:12 pm	-0.058160	286	12.31	
Replicates	326.3	240.5	290.2	286.7						
JT Baker 5.0 ppb LCS					LCS	11/17/06 02:02:01 pm	4.679000	48145	0.62	
Replicates	48336.0	48370.4	48150.4	47722.6						
% Recovery	93.57									
Prep Blank					PBK	11/17/06 02:04:50 pm	-0.018820	683	1.40	
Replicates	683.6	683.2	695.2	671.8						
MRL 0.2 ppb					UNK	11/17/06 02:07:36 pm	0.149300	2382	1.24	%R=
Replicates	2343.5	2382.8	2384.5	2415.4						
%R= 74.6										
LFB -MRL 0.2 ppb					UNK	11/17/06 02:10:25 pm	0.165700	2548	0.20	
Replicates	2550.9	2552.3	2545.6	2541.4						
%R= ~~74.6~~ 82.8										
LFB 2.0 ppb					UNK	11/17/06 02:13:15 pm	1.929000	20369	1.87	
Replicates	19906.1	20219.6	20594.4	20754.3						
%R= 96.4										
CCV 5.0 ppb					CCV	11/17/06 02:16:03 pm	5.031000	51703	0.66	
Replicates	51691.9	51961.6	51935.8	51223.4						
% Recovery	100.62									
CCB					CCB	11/17/06 02:19:39 pm	-0.059730	270	10.57	
Replicates	234.6	260.9	299.8	284.9						
FRW1-1					UNK	11/17/06 02:22:25 pm	0.111600	2001	0.56	
Replicates	2013.3	2002.1	1986.1	2002.9						
FRW1-2					UNK	11/17/06 02:25:12 pm	0.130300	2190	0.78	
Replicates	2187.1	2173.9	2185.6	2214.2						
FRW1-3					UNK	11/17/06 02:27:59 pm	0.119300	2079	0.22	
Replicates	2077.4	2075.0	2085.5	2077.0						
FRW1-4					UNK	11/17/06 02:30:47 pm	0.122800	2115	0.63	
Replicates	2102.8	2118.3	2105.4	2132.0						

Sample Name					Type	Date/Time	Conc (ppb)	µAbs	%RSD	Flags
FRW1-5					UNK	11/17/06 02:33:34 pm	0.121100	2097	1.05	
Replicates	2095.2	2085.8	2128.5	2078.8						
FRW1-6					UNK	11/17/06 02:36:21 pm	0.129800	2185	1.25	
Replicates	2167.5	2159.4	2219.5	2195.0						
FRW1-7					UNK	11/17/06 02:39:09 pm	0.124500	2132	0.55	
Replicates	2141.4	2140.8	2128.0	2116.8						
CCV 5.0 ppb					CCV	11/17/06 02:41:56 pm	5.194000	53352	0.22	
Replicates	53391.4	53375.8	53458.4	53183.1						
% Recovery	103.88									
CCB					CCB	11/17/06 02:45:32 pm	-0.058370	284	3.08	
Replicates	288.8	293.1	274.0	279.3						

Notes

~~MDL 3 Day mean (10/27/06) = 0.007 ppb~~

Linear Dynamic Range (10/27/06) = 35 ppb

LFB and matrix spike concentration = 2.0 ppb

FRW-1

T.U. = 0.2 ppb

$\bar{x}_7 = 0.12277$

$S_7 = 0.00643$

%RSD = 5.24

MDL = 0.020 ppb

Analysis Parameters

Instrument

Conditions

Gas flow (mL/min)	Sample Uptake (s)	Rinse (s)	Read delay (s)	Replicates (#)	Replicate time (s)	Pump speed (%)	Wavelength (nm)
40	60.00	100.00	61.25	4	3.50		253.65

Instrumental Zero

Zero before first sample: Yes

Zero periodically: Yes

Before each calibration.

Baseline Correction

#1 Start time (s)	#1 End time (s)	#2 Start time (s)	#2 End time (s)
16.50	23.25		

Standby Mode

Enabled: Yes

Standby Options: pump off, gas off, lamp off

Autodilution

Enabled: No

Condition:

Tube # range:

If no autodilution tubes remaining

Calibration

Settings

Algorithm	Through blank	Weighted fit	Cal. Type	Racalibration rate	Reslope rate	Reslope standard
Linear	No	No	Normal	0	0	N/A

Limits

Calibration slope		Reslope		Coeff. of
Lower (%)	Upper (%)	Lower (%)	Upper (%)	Determination
10	180	75	125	0.99500

Error action: Stop analysis

QC

GLP Override: Yes

QC Tests

PBK

Concentration (ppb)
0.0000

Failure flag: Q

Error action for manually inserted QC: Flag and continue

CCB

Concentration (ppb)
0.0070

Failure flag: Q

Error action for manually inserted QC: Flag and continue

ICB

Concentration (ppb)
0.0070

Failure flag: Z

Error action for manually inserted QC: Flag and continue

CCV

Concentration (ppb)	Low Limit %	High Limit %
5.0000	90.0000	110.0000

Failure flag: Q

Error action for manually inserted QC: Repeat, flag and continue

ICV

Concentration (ppb)	Low Limit %	High Limit %
5.0000	95.0000	105.0000

Failure flag: Q

Error action for manually inserted QC: Repeat, flag and continue

LCS

Concentration (ppb)	Low Limit %	High Limit %
5.0000	90.0000	110.0000

Failure flag: L

Error action for manually inserted QC: Stop analysis

From SOP for 200.7, for Barium, Corrected Version

3.3. Chemical Interferences – Occur in specific matrix types. Special operating parameters may be required to compensate or standard – addition technique may be used.

3.4. Memory Interference or Carryover – Samples containing high concentrations of elements may leave residual analyte in the sample introduction components, thus contaminating subsequent samples. This is reduced by increasing the aspiration of the rinse solution.

3.5. Spectral Drift – Occurs with changes in ambient temperature, must restandardize.

4. Sample Handling.

4.1. Receiving – Samples for metals analysis should be in an approved container of 1 liter or 1 quart size, preferably plastic, and supplied by our lab. Container must be tested to make sure it is metals free. Samples not received in approved containers can be rejected. All samples are logged in and numbered.

4.2. Preservation – Our lab does not recommend field preservation of metals samples due to hazards of acid contamination. Unpreserved samples must be acidified upon receipt with 2 ml concentrated Nitric Acid per liter volume. Mix thoroughly by capping and shaking. Note acidification with a blue "A" with date on cap. To ensure pH<2, check with pH test paper and record in log book along with dates of receipt, acidification, date of sampling.

4.3. Holding Time – Following acidification, sample must be held for 16 hours before further processing. Preserved sample holding time is 6 months from time of preservation.

4.4. Sample Rejection – Ant regulatory compliance monitoring sample may be rejected for any of the specific reasons listed below that are not covered in the Environmental Chemistry Quality Assurance Manual

4.4.1 Sample is > 14 days old.

4.4.2 Sample was collected in a bottle not provided/ approved by the laboratory.

4.4.3 Sample volume was less than required.

4.5. Sample Preparation.

4.5.1. Digestion Tubes – Use 35 ml conical bottom polypropylene screw cap centrifuge tubes as digestion vessel (Available from Sarstedt). First shoulder mark down from top of tube is 35 ml mark. Verify volume of one tube per batch with Class A graduate and document in logbook. Caps and tubes must have sample numbers written on them to identify and avoid cross-contamination. Remove caps from tubes and store in clean manner.

4.5.2. Digestion Procedure – Shake sample and pour into 35 ml tube to top mark. Add 700 µl HNO_3 acid from dispenser. Also, add 350 µl HCl acid from dispenser. Place tubes with samples in digester blocks in hood. Place glass covers over tubes to protect from hood environment. Maintain a thermometer in one tube in center hole in each block to monitor temperature. Thermometer should be in same type tube as samples with same level of liquid (D.I. water). Heat sample to 95 ° C and evaporate down to 1/5 volume (7ml). Put caps loosely on vials, reduce heat and reflux for 30 minutes. Place a thermometer through a hole in a cap and place on the

Results in 2% HNO_3 + 1% HCl Acid Matrix

WEST VIRGINIA Department of
Health & Human Resources
BUREAU FOR PUBLIC HEALTH

OFFICE OF LABORATORY SERVICES
ENVIRONMENTAL CHEMISTRY LABORATORY
4710 Chimney Drive, Suite G, Charleston WV 25302
Phone: 1-304-965-2694 FAX: 1-304-965-2696

Laboratory Number: Date Received: County: Public Water System Identification: { }

System/Owner Name: Bill To: Name of Collector: { }
Attention: Attention: Phone Number: Date/Time of Collection:
Address: Address: Collection Point:
City/State: City/State: Type of Water: Source of System:
ZipCode: ZipCode: Purpose of Sample: Sample Received :

Sample Preservation Code (PC): [1] None, [2] Nitric Acid to pH<2, [3] Sulfuric Acid to pH<2, [4] Ice, [5] Zinc Acetate, [6] Other

REGULATED PRIMARY CONTAMINANTS

PC	CONTAMINANT	Results (mg/L)	Analyst	Date	MCL (mg/L)	MRL (mg/L)	MDL (mg/L)	Method Number	PC	CONTAMINANT	Results (mg/L)	Analyst	Date	MCL (mg/L)	MRL (mg/L)	MDL (mg/L)	Method Number
	Antimony				0.006	0.003	0.00122	SM3113B		Selenium				0.05	0.002	0.00040	SM3113B
	Arsenic				0.010	0.002	0.00036	SM3113B		Thallium				0.002	0.002	0.0006	EPA200.9
	Barium				2.00	0.005	0.000503	EPA200.7		Fluoride				* 2.0 | 4.0	0.1	0.001	EPA300.0
	Beryllium				0.004	0.0002	0.00003	SM3113B		Nitrate - N				10.0	0.05	0.005	EPA353.2
	Cadmium				0.005	0.001	0.00010	SM3113B		Nitrite - N				1.00	0.05	0.006	EPA353.2
	Chromium				0.10	0.001	0.00048	SM3113B		Nitrate / Nitrite - N				10.0	0.05	0.005	EPA353.2
	Lead				** 0.015	0.001	0.00018	SM3113B		Cyanide, Free				0.2	0.05	0.002	SM4500CNF
	Mercury				0.002	0.0002	0.00002	EPA245.1									

REGULATED SECONDARY CONTAMINANTS

PC	CONTAMINANT	Results (mg/L)	Analyst	Date	SMCL (mg/L)	MRL (mg/L)	MDL (mg/L)	Method Number	PC	CONTAMINANT	Results (mg/L)	Analyst	Date	SMCL (mg/L)	MRL (mg/L)	MDL (mg/L)	Method Number
	Aluminum				-----	0.003	0.001	SM3113B		pH (pH units)‡				6.5 - 8.5	4.0	-----	EPA150.1
	Chloride				250	2.0	0.006	EPA300.0		Silver				0.1	0.0005	0.00020	SM3113B
	Copper				** 1.3	0.001	0.00019	SM3113B		Sulfate				250	4.0	0.004	EPA300.0
	Iron				0.3	0.05	0.014	SM3111B		Total Dissolved Solids				500	-----	-----	SM2540C
	Manganese				0.05	0.02	0.006	SM3111B		Zinc				5.0	0.02	0.007	SM3111B

MISCELLANEOUS PARAMETERS

PC	CONTAMINANT	Results (mg/L)	Analyst	Date	MCL (mg/L)	MRL (mg/L)	MDL (mg/L)	Method Number	PC	CONTAMINANT	Results (mg/L)	Analyst	Date	Notification (mg/L)	MRL (mg/L)	MDL (mg/L)	Method Number
	Alkalinity, Total, as $CaCO_3$				-----	1.0	-----	SM2320B		Sodium				20	2.0	0.07	SM3111B
	Calcium Hardness, as $CaCO_3$				----	2.0	----	SM3500CaD		Magnesium				----	2.0	-----	SM3500MgE
	Total Hardness, as $CaCO_3$				----	2.0	-----	SM2340C		Nickel				-----	0.002	0.00068	SM3113B
	Turbidity (NTU)				----	0.2	-----	EPA180.1		Chlorine, Free				-----	0.2	-----	SM4500ClG
	Conductivity				-----	43	0.054µS/cm	SM2510B		Chlorine, Total				-----	0.2	-----	SM4500ClG
	Hydrogen Sulfide				----	0.05	------	EPA376.2		Calcium				----	0.8	----	SM3500CaD
	Ortho-phosphate				-----	0.1	-----	EPA300.0									

+ Sample >4°C, NOT VALID
‡ Holding time was exceeded when sample was received, NOT VALID FOR SDWA COMPLIANCE REPORTING
* Notification level MCL = Maximum Contaminant Level MRL = Minimum Reporting Limit
** Action level SMCL = Secondary Maximum Contaminant Level MDL = Method Detection Limit

Remarks: **Metals Preserved in Laboratory**

REVIEWED BY: _____ DATE REPORTED: _____

Appendix B

TOTAL DISSOLVED SOLIDS WORKSHEET LOG

Name and Lot No. of Type A/E Glass Fiber Filter: _____

Serial Number of ASTM Type I Class 2 Weights in use: _____

Sample Number	Volume of Sample ml	Initial Beaker Weight grams	Weighing # 1 Beaker + Residue grams	Weighing # 2 Beaker + Residue grams	Filtered Residue Weighing #1 (B - A) * 1000 / D grams	Filtered Residue Weighing #2 (C - A) * 1000 / D grams	Net Filtered Residue (E + F) / 2 grams	Date Analyst

A = Initial Beaker Weight grams
B = Weighing #1 Beaker + Residue grams
C = Weighing #2 Beaker + Residue grams

D = Liter of Sample (Sample volume should be 100ml, unless residue is expected to be greater than 200mg/L)
E = Filtered Residue Weighing #1 (B-A)*1000/D grams
F = Filtered Residue Weighing #2 (C-A)*1000/D grams

(3)

pH NOTEBOOK

pH Meter Manufacture/Model: **Corning pH Meter 430**

pH Electrode Manufacture/Model: **Corning 476436**

Electrode Filling Solution Lot Number: _____

4.00 pH Calibration Buffer Manufacture/Lot Number: 1606366 W047

7.00 pH Calibration Buffer Manufacture/Lot Number: B44522 W059

10.0 pH Calibration Buffer Manufacture/Lot Number: B42509

Date/Time/Initials	Calibration Buffer	Buffer Reading	Slope	Sample/QCS	Sample/QCS Reading	Adjusted pH for EPA 353.2 (5.0 to 9.0)	Percent Recovery/RPD
11-3-06 3:45	4.0	4.00					
	7.0	7.00	99%	QCS-1.0 W046	0.99		99%
				060403	1.06	-	
	4.0	4.00	-		-	-	100%
11-9-06 11:05	7.0	7.00					
	10.00	10.01	98%	QCS 1.0 W046	~~1.08~~ 1.02	11-9-06	102 ~~108%~~
				Ammonium Cl - EDTA solution	4.59		
11-13-06 11:50	7.0 7.0	7.00 7.00	-		-	-	100%
	10.0	10.01	100%	QCS-4.0 W047	4.05		
				QCS-1.0 W046	1.00		100%
				LRB	0.94	8.20	
				060403	1.08	7.81	
	7.00	7.00					100%
11-15-06 3:32	7.0	7.00					
	10.0	10.01	98%	QCS-4.0 W047	3.92		98%
				Ammonium Cl - EDTA Reagent	4.50	9.10	
	7.0			pH-7.0	6.98		
	4.0	4.00					
	7.0	7.00	98%	QSC-1.0 W046	0.97		97%
				060405	1.08		
				060406	0.72		
				060407	0.99		
	4.0				4.00		100%

Page _____

File Location: S:\Bigchim\Quality Control Sheets\PH NOTEBOOK.DOC

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SCIENCE CENTER
Analytical Services and Quality Assurance Branch
701 Mapes Road
Fort Meade, MD 20755-5350

December 20, 2006

Andrea M. Labik, Sc. D.
Director
West Virginia Department of Health & Human Resources
Bureau of Public Health
Office of Laboratory Services
167 - 11th Avenue
South Charleston, West Virginia 2503-1137

Dear Dr. Labik:

The final reports for the SDWA on-site assessment of your laboratory and WV's Laboratory Certification program were dated 10/24/06. The corrective action report from Larry Duffield, dated November 20, 2006 (additional materials received 12/7/06 for turbidity) addressed all remaining issues except for mercury and thallium. There were not corrective actions necessary for microbiology and the certification program as only suggestions were provided in the reports. Attached please find the certification update report for inorganic chemistry which reflects the provided corrective actions.

The analyses of SDWA compliance samples should not be performed for thallium using EPA 200.9 until another instrument is available. Also, compliance samples for mercury should not be analyzed until the necessary performance studies are complete and approved for the new instrument and a successful WS PT completed. As there may well be some delay regarding thallium and mercury, I am closing out this assessment. We will update certification for Hg and thallium when the necessary corrective actions are completed and documentation provided.

Sincerely,

Joseph Slayton
Technical Director

cc:
Wanda Johnson (3WP22)
Robert Lange (3WP32)
Charles Jones, Jr. (3EA00)
Robin Costas (3EA20)
George Long (3EA20)
David Russell (3EA20)

On-Site Laboratory Evaluation Update Report (SDWA)

Inorganic Chemistry

(Rev. 12-19-06 JS)

West Virginia Department of Health and Human Resources
Bureau for Public Health
Office of Laboratory Services
Environmental Chemistry Laboratory Section
4710 Chimney Drive, Suite G
Charleston, WV 25302

On-site: September 19-20, 2006

Surveyed by:

Robin Costas
George Long
Joseph Slayton

U.S.E.P.A. - Region III
Analytical Services and Quality Assurance Branch
701 Mapes Road
Ft. Meade, Maryland 20755-5350

Recommended Certification Status:

Based upon the corrective action report dated November 20, 2006 and December 7, 2006 from the September 19-20, 2006 SDWA on-site assessment, the assessment team recommends the following SDWA certification status for organic chemistry.:

LEGEND

C – Certified NA - Not Acceptable
AP – Approved
NP - Not Approved

CONTAMINANT	ON-SITE REVIEW	
		Method
Antimony	C	SM 3113B
Arsenic	C	SM 3113B
Barium	C	EPA200.7
Beryllium	C	SM 3113B
Cadmium	C	SM 3113B
Chromium	C	SM 3113B
Copper	C	SM 3113B
Copper	C	SM 3111B
Cyanide	C	SM 4500 CN F
Fluoride	C	EPA300.0
Lead	C	SM 3113B
Mercury	NC	EPA245.1
Nitrate	C	EPA353.2
Nitrite	C	EPA353.2
Selenium	C	SM 3113B
Thallium	NC	EPA200.9
Chloride	AP	EPA300.0

Sulfate	AP	EPA300.0
TDS	AP	SM2540C
Manganese	AP	SM 3111B
Nickel	AP	SM 3113B
Zinc	AP	SM 3111B
Aluminum	AP	SM 3113B
Iron	AP	SM 3111B
Silver	AP	SM 3113B

LEAD AND COPPER RULE:

CONTAMINANT	ON-SITE REVIEW 11/30/99	
		Method
Lead	C	SM3113B
Copper	C	SM3113B
Copper	C	SM 3111B
pH	C	EPA150.1
Conductivity	C	SM2510B
Calcium or Calcium Hardness as $CaCo_3$	C	SM3500 CAD
Alkalinity	C	SM2320B
Sodium	C	SM3111B
Turbidity	C	EPA180.1

Inspectors:

Robin Costas 12/19/06

George Long 12/19/06

Joseph Slayton 12/19/06

update & close out

JS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ENVIRONMENTAL SCIENCE CENTER
Analytical Services and Quality Assurance Branch
701 Mapes Road
Fort Meade, MD 20755-5350

October 10, 2003

Andrea M. Labik, Sc. D.
Director
West Virginia Department of Health & Human Resources
Bureau of Public Health
Office of Laboratory Services
167 - 11th Avenue
South Charleston, West Virginia 2503-1137

Dear Dr. Labik:

Please thank all for their participation on today's conference call. With this communication I would like to summarize the status of the corrective actions in response to our June 2003 on-site reviews of your laboratory and laboratory certification program and close-out those on-site assessments. With regard to the **SDWA certification of your laboratory**, I think today's meeting was especially helpful to resolve the issue of laboratories to be employed for SDWA analyses by WV's Office of Environmental Health Services (OEHS), i.e., they must be certified by EPA and Region 3 is accepting the certifications of states other than WV (can be a laboratory which also has WV certification and can be a laboratory physically within WV). This was item #1 on the original laboratory assessment report. Richard Rogers has provided the following related Federal Register references: 40 C.F.R. 142.11 (iv); 40 C.F.R 142.10 (b) (3) (i); and 142.10 (b) (4).

Also, I have received an electronic copy of the updated SOP for pH from your laboratory this afternoon (item #3 in the original findings report). As per our meeting today, I double checked the material from Dr. Morganroth postmarked 9/5/03 and indeed the inorganic analysis worksheet (item #2), and the bench sheet for IC (item #4) were included in the package. Based upon this additional information I am recommending the following certification status for your laboratory: **Certification Status:**
Certified:

Metals:
Arsenic; Antimony; Barium; Beryllium; Cadmium; Chromium; Copper; Lead; Mercury; Nickel, Selenium; Sodium; and Thallium.

Certified:

Inorganic Non-Metals:
Alkalinity; Conductance; Cyanide; Fluoride; Nitrate; Nitrite; pH; Turbidity; and Hardness.

Secondary Analytes:
Acceptable:

Metals:
Aluminum; Iron; Manganese; Silver; and Zinc.

Inorganic Non-Metals:
Chloride; Sulfate; and TDS.

Regarding the review of **WV's SDWA Laboratory Certification Program** one item was unfortunately not discussed during today's session, namely item #4 from the original report:

"#4. Scope of Certification/Approval:

Finding: The listing of laboratory certifications and approvals provided by Laboratory Services for chemistry do not include the full scope of the SDWA program and also include certifications which are not provided by Laboratory Services.

Suggested Corrective Action: Laboratory Services should work with the WV Environmental Health Services program managers to determine possible additional areas for certification and/or approval, e.g., alkalinity, bromate, calcium, chlorite, conductivity, orthophosphate, pH, turbidity, silica, Specific Ultraviolet Absorption (SUVA) and TOC. Also, consideration should be given to dropping radiochemistry and asbestos from the listing.

WV Response: Appropriate action with regard to the **Suggested Corrective Action** will need to be addressed after Laboratory Services and the Office of Environmental Health Services have a meeting to jointly decide the appropriate action that should be taken to add additional analytes from the specified list. We are presently certifying laboratories for TOC and SUVA analyses if they are presently a certified drinking water laboratory and have obtained acceptable WS PT results for these two analytical areas. For some time our certification personnel have wished to remove radiochemistry analyses from our listing of certifiable analytes. We have never certified laboratories for radionuclide analyses and have listed laboratories that were so certified by the Office of Environmental Health Services for informational purposes only. Although we can make such a deletion, I am not sure we can take a like action for asbestos since we are presently certifying (via reciprocity) one out-of-State laboratory for this parameter. This laboratory is situated in California and is certified for asbestos (by two EPA methods) by the California NELAP Authority."

I spoke to OEHS manager, Linda Keller, after our meeting and she indicated the State does need to approve the list of analytes listed, but that a number of these are analyzed at the DW facilities

and OEHS personnel approve the procedures and equipment. She encourages (if time permits) the Office of Laboratory Services to offer the review and approval of these analytical areas as part of the WV lab certification program. This would be limited to those analytes with holding times which would permit a commercial laboratory to perform the analyses (not pH for example). Please contact her if you have questions. I think this closes out the issues on the Laboratory Certification Program and **I look forward to receiving copies of the on-site assessment reports as they are issued and copies of the certificates of the laboratories used or planned to be used by OEHS** (OEHS to work with Richard Rogers).

Sincerely,

Joseph Slayton
Technical Director

cc:
Richard Rogers (3WP22)
Wanda Johnson (3WP22)
Robert Lange (3WP32)
Charles Jones, Jr. (3EA00)
Linda Miller (WV OEHS)

Joe Slayton/ESC/R3/USEPA/US
02/15/2007 07:59 PM
To
Joe Slayton/ESC/R3/USEPA/US@EPA
cc
George Long/ESC/R3/USEPA/US@EPA, Larry Duffield
<larryduffield@wvdhhr.org>, Robin Costas/ESC/R3/USEPA/US@EPA
bcc

Subject
Re: Fw: Radiochemistry Assessor Training

Update report from the WV 2006 on-site report for Inorganic Chemistry.

Joe Slayton/ESC/R3/USEPA/US
02/12/2007 11:41 AM
To
Larry Duffield <larryduffield@wvdhhr.org>
cc
George Long/ESC/R3/USEPA/US@EPA
Subject
Re: Fw: Radiochemistry Assessor Training

Thanks....

I have asked C.JOnes to update your certificate for the two copper methods and Hg...the latter based on the WS results from ERA.

Larry Duffield <larryduffield@wvdhhr.org>
02/12/2007 08:30 AM
To
Joe Slayton/ESC/R3/USEPA/US@EPA
cc

Subject
Re: Fw: Radiochemistry Assessor Training

Joe,

Here is Dan Hill's info you requested:

Dan Hill, Chief
Radiological Health Program
DHHR Bureau for Public Health, OEHS
Capitol and Washington Streets

1 Davis Square, Suite 200
Charleston, WV 25301-1798
304-558-6772
304-558-0524 FAX
danhill@wvdhhr.org

Thanks for keeping me informed about our metals status update.

Larry A. Duffield
Program Manager I
Chief Certification Officer, Chemistry
WVDHHR-Office of Laboratory Services
Environmental Chemistry Section
4710 Chimney Drive, Suite G
Charleston, WV 25302
Phone: (304) 965-2694 X 2222
FAX: (304) 965-2696
E-Mail: larryduffield@wvdhhr.org

>>> <Slayton.Joe@epamail.epa.gov> 02/10 9:43 PM >>>
LarryD I am sorry for the delay in getting your certificate updated for the two methods for copper and now the Hg since acceptable for this on the last PT. CharlieJ's sister passed and it seems it is taking for ever to get the last few loose ends tied off. While I have you on the line...could you give me Daniel Hills address and phone number so I can add it to our contact list for Rad Chem Cert in WV. Thanks, JoeS

On-Site Laboratory Evaluation Update Report (SDWA)

Inorganic Chemistry

(Rev. 2-12-07 JS)

West Virginia Department of Health and Human Resources
Bureau for Public Health
Office of Laboratory Services
Environmental Chemistry Laboratory Section
4710 Chimney Drive, Suite G
Charleston, WV 25302

On-site: September 19-20, 2006

Surveyed by:

Robin Costas
George Long
Joseph Slayton

U.S.E.P.A. - Region III
Analytical Services and Quality Assurance Branch
701 Mapes Road
Ft. Meade, Maryland 20755-5350

Recommended Certification Status:

Based upon the corrective action report dated November 20, 2006 and December 7, 2006 and the WS-124 results for Hg from the September 19-20, 2006 SDWA on-site assessment, the assessment team recommends the following SDWA certification status for inorganic chemistry:

LEGEND

C – Certified NA - Not Acceptable
AP – Approved
NP - Not Approved

CONTAMINANT	ON-SITE REVIEW	
		Method
Antimony	C	SM 3113B
Arsenic	C	SM 3113B
Barium	C	EPA200.7
Beryllium	C	SM 3113B
Cadmium	C	SM 3113B
Chromium	C	SM 3113B
Copper	C	SM 3113B
Copper	C	SM 3111B
Cyanide	C	SM 4500 CN F
Fluoride	C	EPA300.0
Lead	C	SM 3113B
Mercury	C	EPA245.1
Nitrate	C	EPA353.2
Nitrite	C	EPA353.2
Selenium	C	SM 3113B
Thallium	NC	EPA200.9
Chloride	AP	EPA300.0

Sulfate	AP	EPA300.0
TDS	AP	SM2540C
Manganese	AP	SM 3111B
Nickel	AP	SM 3113B
Zinc	AP	SM 3111B
Aluminum	AP	SM 3113B
Iron	AP	SM 3111B
Silver	AP	SM 3113B

LEAD AND COPPER RULE:

CONTAMINANT	ON-SITE REVIEW 11/30/99	
		Method
Lead	C	SM3113B
Copper	C	SM3113B
Copper	C	SM 3111B
pH	C	EPA150.1
Conductivity	C	SM2510B
Calcium or Calcium Hardness as $CaCo_3$	C	SM3500 CAD
Alkalinity	C	SM2320B
Sodium	C	SM3111B
Turbidity	C	EPA180.1

Inspectors:

Robin Costas 2/12/07

George Long 2/12/07

Joseph Slayton 2/12/07